Compact electric scissors & Optimum scissors



CONTENTS

1- TECHNICAL CARACTERISTICS

1.1 - COMPACT 8 AND COMPACT 8W TECHNICAL DATA

Description	Compact 8	Compact 8W
Load (indoor use)	350 kg, including 2 people	450 kg, including 3 people
Load (outdoor use)	120 kg, including 1 person	120 kg, including 1 person
Manual lateral force (indoor use)	40 daN	40 daN
Manual lateral force (outdoor use)	20 daN	20 daN
Maximum wind speed (indoor use)	0 Km/h	0 Km/h
Maximum wind speed (outdoor use)	45 km/h	45 Km/h
Floor height	6.18 m	6.27 m
Working height	8.18 m	8.27 m
Folded length	2.31 m	
Folded length with steps	2.48 m	
Overall width	0.81 m	1.20 m
Folded height (handrails)	1.99 m	2.14 m
Folded height (platform)	0.87 m	1.02 m
Wheel base	1.86 m	
Floor clearance	130 mm	
Floor clearance with pothole system extended	25 mm	
Platform dimension	2.3 m x 0.8 m	2.3 m x 1.2 m
Extension dimension	0.92 m	
Extension capacity	150 Kg	
Travel speed, machine folded	0/3.5 km/h	
Travel speed, machine raised	0/1 km/h	
Interior turning radius	0.34 m	0.2 m
Exterior turning radius	2.38 m	2.5 m
Maximum slope during travel	25%	23%
Maximum tilt permitted	2°	3°
Hydraulic tank	25 l	
Total mass	1730 Kg	1950 Kg
Max. load on one wheel	1350 daN	1600 daN
Maximum pressure on the floor	6.7 daN/cm^2	7.9 daN/cm^2
Number of drive wheels	2	2
Number of steering wheels	2	2
Tyres	Non-marking - solid rubber 38x13x5 cm	
Wheel diameter	380 mm	
Freewheel	YES	
Movements	Proportional controls	
Batteries	24 V - 180 Amp/h C5	24 V - 250 Amp/h C5
General hydraulic pressure Travel Steering Lifting	200 bars 200 bars 150 bars 165 bars	
Raising time	37 s	44 s
Lowering time	41 s	56 s
EC Standards	YES	

1.2 - COMPACT 10N, COMPACT 10 TECHNICAL DATA

Description	***Compact 10N***	***Compact 10***
Load (indoor use)	230 kg, including 2 people	450 kg, including 3 people
Load (outdoor use)	forbidden	120 kg, including 1 person
Manual lateral force (indoor use)	40 daN	40 daN
Manual lateral force (outdoor use)	forbidden	20 daN
Maximum wind speed (indoor use)	0 km/h	0 km/h
Maximum wind speed (outdoor use)	forbidden	45 km/h
Floor height	8.08 m	8.14 m
Working height	10.08 m	10.14 m
Folded length	2.31 m	
Folded length with steps	2.48 m	
Overall width	1.20 m	
Folded height (handrails)	2.18 m	2.26 m
Folded height (platform)	1.07 m	1.14 m
Wheel base	1.86 m	
Floor clearance	130 mm	
Floor clearance with pothole system extended	25 mm	
Platform dimension	2.3 m x 0.8 m	2.3 m x 1.2 m
Extension dimension	0.92 m	
Extension capacity	120 Kg	150 kg
Travel speed, machine folded	0/3.5 km/h (variable)	
Travel speed, machine raised	0/1 km/h	
Interior turning radius	0.34 m	0.2 m
Exterior turning radius	2.38 m	2.5 m
Maximum slope during travel	23%	
Maximum tilt permitted	2°	3°
Hydraulic tank	25 l	
Total mass	2160 Kg	2330 Kg
Max. load on one wheel	1355 daN	1350 daN
Maximum pressure on the floor	8 daN/cm^2	7.65 daN/cm^2
Number of drive wheels	2	2
Number of steering wheels	2	2
Tyres	Solid rubber 38x15x5 cm	
Wheel diameter	380 mm	
Freewheel	YES	
Movements	Proportional controls	
Batteries	24 V - 180 Amp/h C5	24 V - 250 Amp/h C5
General hydraulic pressure Travel Steering Lifting	220 bars 220 bars 150 bars 165 bars	
Raising time	51 s	
Lowering time	42 s	
EC Standards	YES	

1.3 - COMPACT 12 TECHNICAL DATA

Description	***Compact 12***	
Load (indoor use)	300 kg, including 2 people	
Load (outdoor use)	120 kg, including 1 person	
Manual lateral force (indoor use)	40 daN	
Manual lateral force (outdoor use)	20 daN	
Maximum wind speed (indoor use)	0 Km/h	
Maximum wind speed (outdoor use)	45 km/h	
Floor height	10 m	
Working height	12 m	
Folded length	2.31 m	
Folded length with steps	2.48 m	
Overall width	1.20 m	
Folded height (handrails)	2.38 m	
Folded height (platform)	1.26 m	
Wheel base	1.86 m	
Floor clearance	130 mm	
Floor clearance with pothole system extended	25 mm	
Platform dimension	2.3 m x 1.2 m	
Extension dimension	0.92 m	
Extension capacity	150 Kg	
Travel speed, machine folded	0/3.5 km/h (variable)	
Travel speed, machine raised	0/1 km/h	
Interior turning radius	0.2 m	
Exterior turning radius	2.5 m	
Maximum slope during travel	23%	
Maximum tilt permitted	3°	
Hydraulic tank	25 l	
Total mass	2630 Kg	
Max. load on one wheel	1600 daN	
Maximum pressure on the floor	10.15 daN/cm^2	
Number of drive wheels	2	2
Number of steering wheels	2	2
Tyres	Solid rubber 38x13x5 cm	
Wheel diameter	380 mm	
Freewheel	YES	
Movements	Proportional controls	
Batteries	24 V - 250 Amp/h C5	
General hydraulic pressure Travel Steering Lifting	240 bars 240 bars 150 bars 155 bars	
Raising time	85 s	
Lowering time	50 s	
EC Standards	YES	

1.4 - OPTIMUM 6 AND OPTIMUM 8 TECHNICAL DATA

Description	***Optimum 6***	***Optimum 8***
Load	270 kg, including 2 people (indoor use) / 115 kg including 1 people (outdoor use)	230 kg, including 2 people (indoor use)
Manual lateral force	40 daN (indoors)/20 daN (outdoors)	40 daN
Maximum wind speed	0 km/h (indoors)/45 km/h (outdoors)	0 km/h
Floor height	4.5 m	5.8 m
Working height	6.3 m	7.6 m
Folded length with steps	1.88 m	
Overall width	0.76 m	
Folded height (handrails)	1.90 m	1.99 m
Folded height (platform)	0.79 m	0.87 m
Wheel base	1.38 m	
Floor clearance	80 mm	
Floor clearance with pothole system extended	14 mm	
Platform dimension	1.73 m x 0.68 m	
Extension dimension	0.92 m	
Extension capacity	115 Kg	
Travel speed, machine folded	0/4.5 km/h	
Travel speed, machine raised	0/0.6 km/h	
Interior turning radius	0.4 m	
Exterior turning radius	1.8 m	
Maximum slope during travel	25%	
Maximum tilt permitted	2°	
Hydraulic tank	20 l	
Total mass	1355 Kg	1420 Kg
Max. load on one wheel	698 daN	872 daN
Maximum pressure on the floor	8.54 daN/cm^2	10.56 daN/cm^2
Number of drive wheels	2	2
Number of steering wheels	2	2
Tyres	Non-marking - Solid rubber	
Wheel diameter	317 mm	
Freewheel	YES	
Movements	Proportional controls	
Batteries	24 V - 180 Amp/h C5	
General hydraulic pressure	230 bars	
Travel	230 bars	
Steering	100 bars	
Lifting	110 bars	130 bars
Raising time	20 s	23 s
Lowering time	35 s	32 s
EC Standards	YES	

2- TIGHTENING TORQUES

2.1 - TIGHTENING TORQUE FOR LARGE THREAD SCREWS

Nominal diameter	***Tightening torque in N.M***		
	8.8	***10.9***	***12.9***
M 6*1	9 to 11	13 to 14	15 to 17
M 7*1	15 to 19	21 to 24	26 to 28
M 8*1.25	22 to 27	31 to 34	37 to 41
M 10*1.5	43 to 45	61 to 67	73 to 81
M 12*1.75	75 to 94	110 to 120	130 to 140
M 14*2	120 to 150	170 to 190	200 to 220
M 16*2	190 to 230	260 to 290	320 to 350
M 18*2.5	260 to 320	360 to 400	440 to 480
M 20*2.5	370 to 450	520 to 570	620 to 680
M 22*2.5	500 to 620	700 to 770	840 to 930
M 24.3*3	630 to 790	890 to 990	1070 to 1180
M 27*3	930 to 1150	1300 to 1400	1560 to 1730
M 30*3.5	1260 to 1570	1770 to 1960	2200 to 2350

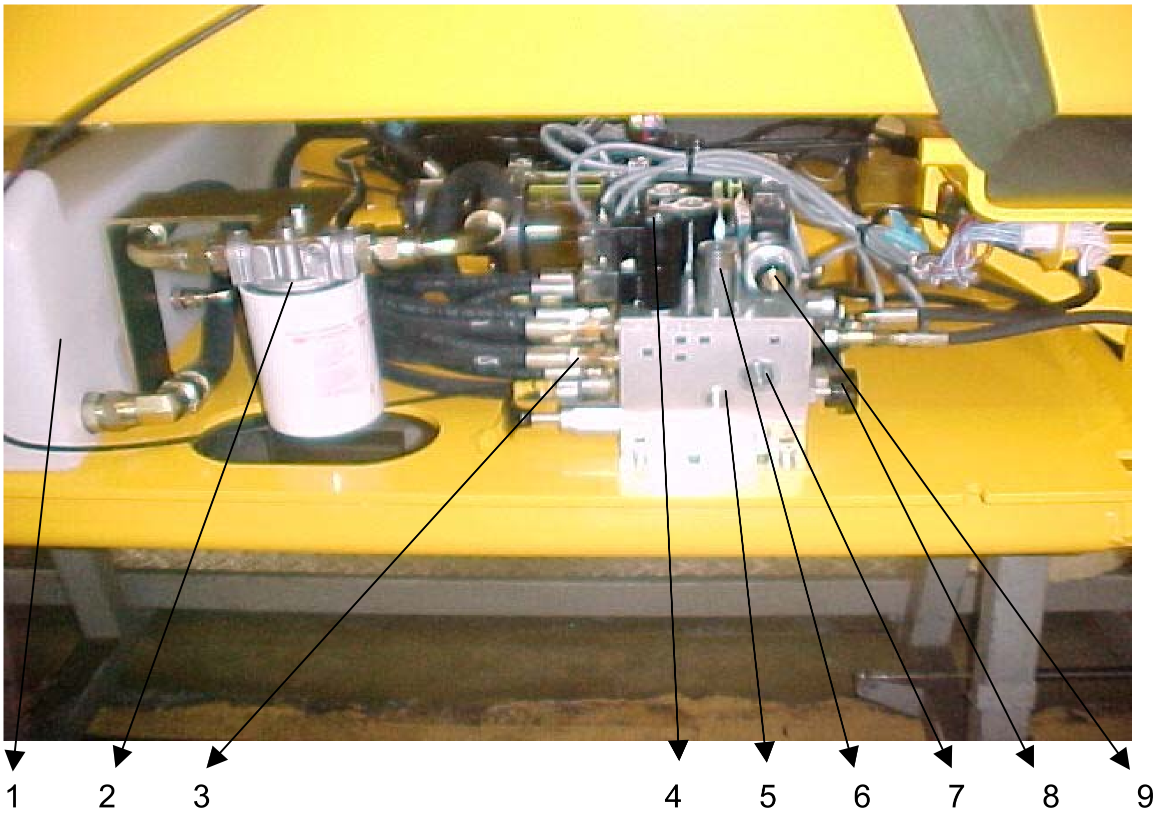
2.2 - TIGHTENING TORQUE FOR FINE THREAD SCREWS

Nominal diameter	***Tightening torque in N.M***		
	8.8	***10.9***	***12.9***
M 8*1	24 to 29	33 to 37	40 to 44
M 10*1.25	46 to 57	64 to 71	77 to 85
M 12*1.25	83 to 100	120 to 130	140 to 150
M 14*1.5	130 to 160	180 to 200	220 to 240
M 16*1.5	200 to 250	280 to 310	340 to 370
M 18*1.5	290 to 360	410 to 450	490 to 540
M 20*1.5	410 to 510	570 to 630	690 to 760
M 22*1.5	550 to 680	780 to 870	920 to 1000
M 24*1.5	690 to 860	970 to 1070	1160 to 1290
M 27*2	1000 to 1300	1400 to 1560	1690 to 1880
M 30*2	1400 to 1700	1960 to 2180	2350 to 2610

3- HYDRAULIC AND ELECTRIC COMPONENTS

3.1 -   HYDRAULIC COMPONENTS

3.1.1 MK3 Block



1 :   Hydraulic tank

2 :   Hydraulic filter

3 :   (HP1)Emergency pump (translatory motion brake release) (242 160 8730)

4 :   (SV1)YV 5 Command steering solenoid valve (244 050 7640)

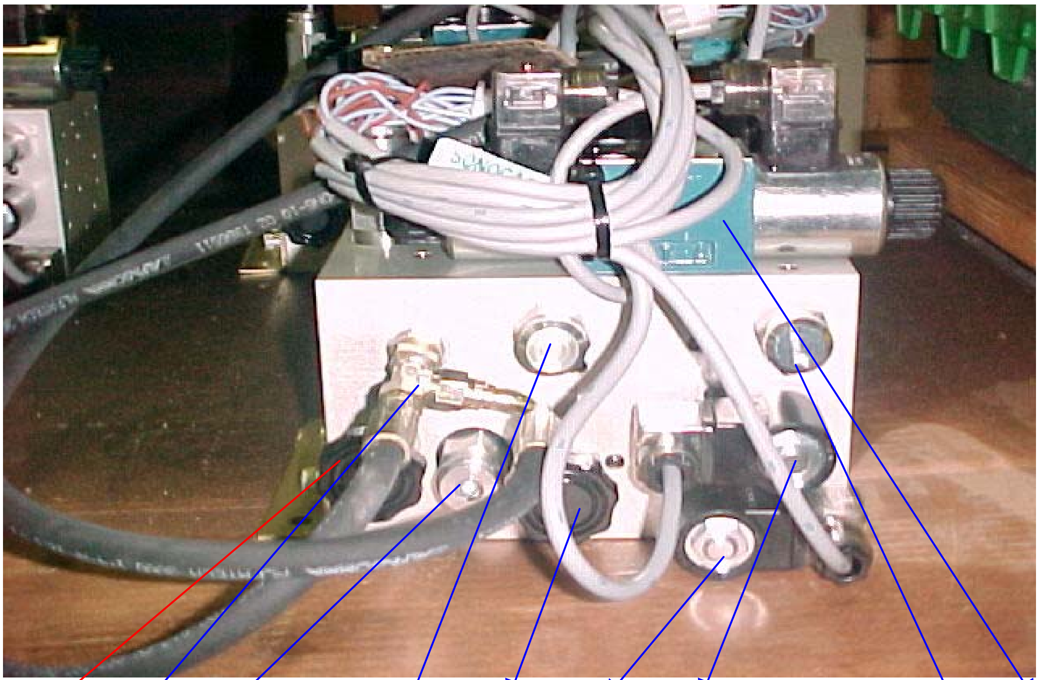
5 :   Flow limiting valve (spray nozzle 242 070 3510) + (cap 242 020 9880)

6 :   Adjustment of the steering pressure (2420120 3350)

7 :   (LS1) ball-valve to select the feeding of vacuum brakes, or by feeding the translatory motion circuit, or by the emergency pump. (242 190 6370)

8 :   (NV1) Emergency pump control valve - closed: brake release pump is working. Open: usual functioning of the vacuum brakes. (242 180 8630)

9 :   YV2 A & B Solenoid valve selecting the direction of travel (244 050 7600)



8 10 11 12 13 14 15 16 9

10 : Fr Block output feeding vacuum brakes

11 : (RV3) Lifting pressure regulating valve: output C1 (242 120 3250)

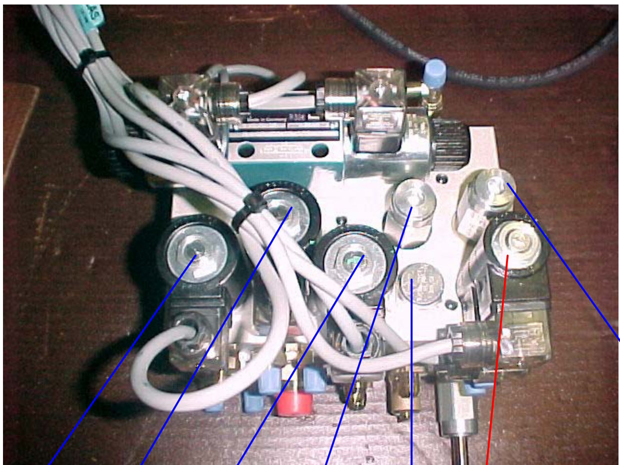
12 : (CB2) Balancing valve (242 220 4990)

13 : (NV2) Balancing valves by-pass valve (242 180 8630)

14 : (SV7) YV9 Fast lowering command solenoid valve (244 050 7630)

15 : (SV3) YV6 Solenoid valve controlling the potholes' spreading out movement (244 050 7890)

16 : (CB1) Balancing valve (244 220 4990)



17 18 19 20 21 4 22

17 : (SV5) YV4 Travel speed selection solenoid valve (244 220 7610)

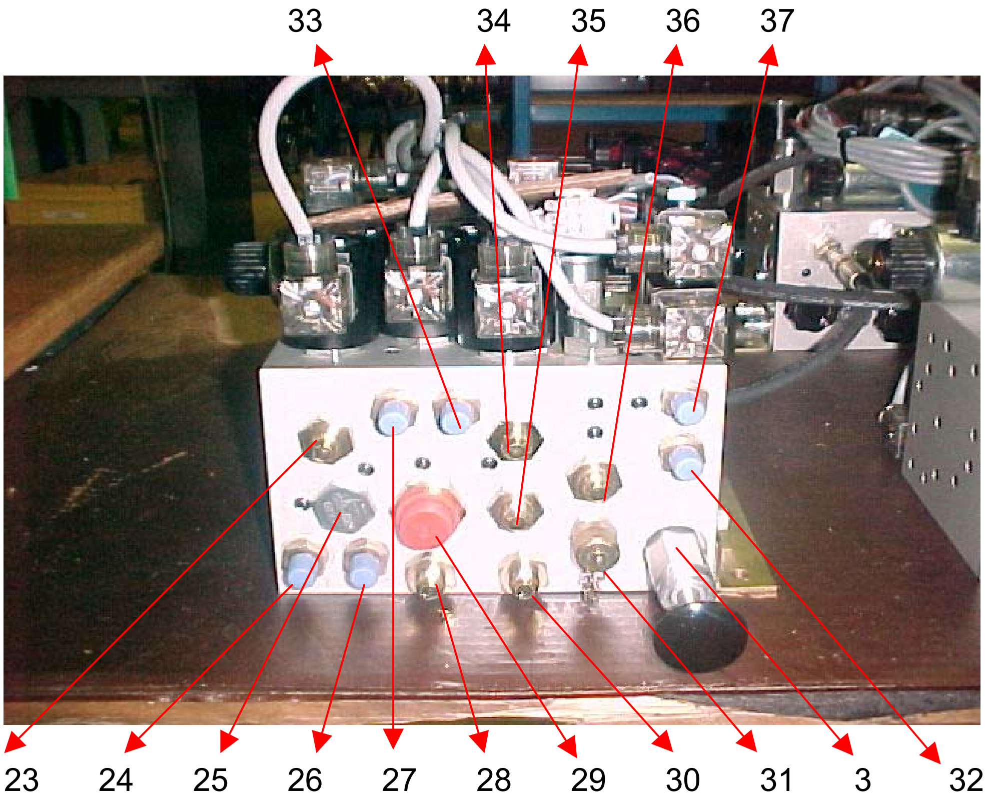
18 : (SV2) YV1 Solenoid valve at rest : travel selection, at work : lifting (244 050 7590)

19 : (SV6)YV3 Solenoid valve selecting travel speed (244 050 7620)

20 : RV2 Translatory motion and maximum limit pressure regulating valve (242 130 3240)

21 : FR1 Steering priority valve (242 220 4980)

22 : RV1 Steering pressure regulating valve (242 120 3350)



23 : A1 : Feeding output for front left travel motors

24 : B1 Block output for pothole re-entry

25 : FD1 Travel motion flow divider : input by the YV4 output. Total output by A1 & A3

26 : B4 Block output for pothole re-entry.

27 : B2 Pothole spreading out device.

28 : C1 Output of YV9 : lifting power supply

29 : T Block output for returning to the tank through the hydraulic filter.

30 : A4 Front right motor travel motion output

31 : MX Minimess tap output measuring pressure (gauge port).

32 : D1 Steering cylinder feeding output.

33 : B3 Pothole spreading out device.

34 : A2 Front left travel motors feeding output

35 : A3 Front right travel motors feeding output.

36 : P Block input taken on the hydraulic pump output.

37: D2 Steering cylinder feeding output.

The machine is equipped with a YV7 solenoid valve directly connected to the lifting cylinder on Compacts 8 , 8w , 10.

On the Compact 12 the YV8 solenoid valve is connected to the top cylinder.

MK3 Block specification

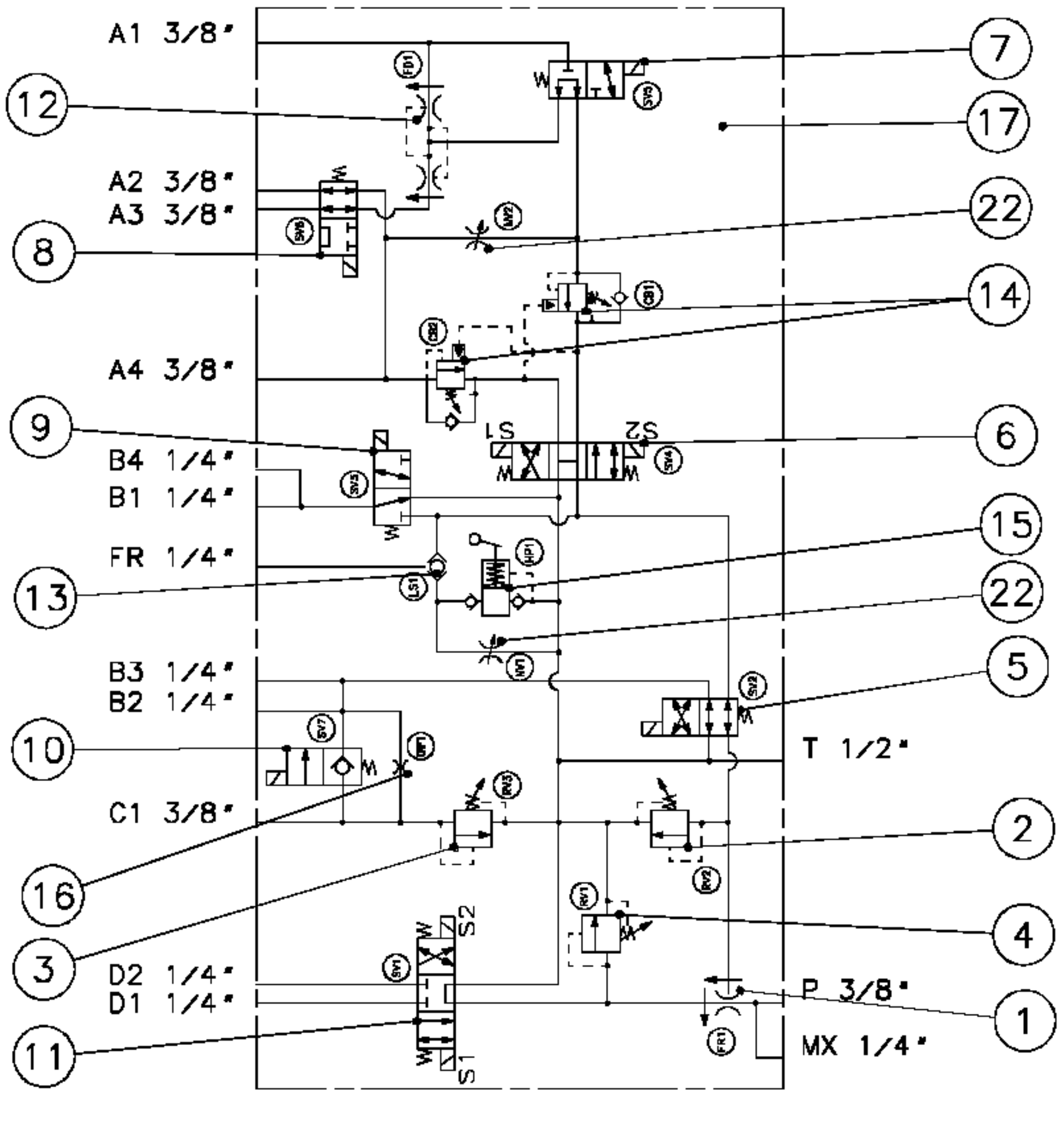
Pinguely-Haulotte		SPECIFICATION
Date : 13/03/01	Page : 1/5	Numéro S5254 a
Machines: COMPACT8/10/12 OPTIMUM6/8	Auteur: D. QUILLERE	Vérificateur: S. BEJI

Modifications

a — Coils orientation (markers 9 and 10) modified according to modification n° 2118 for Compact and Optimum machines

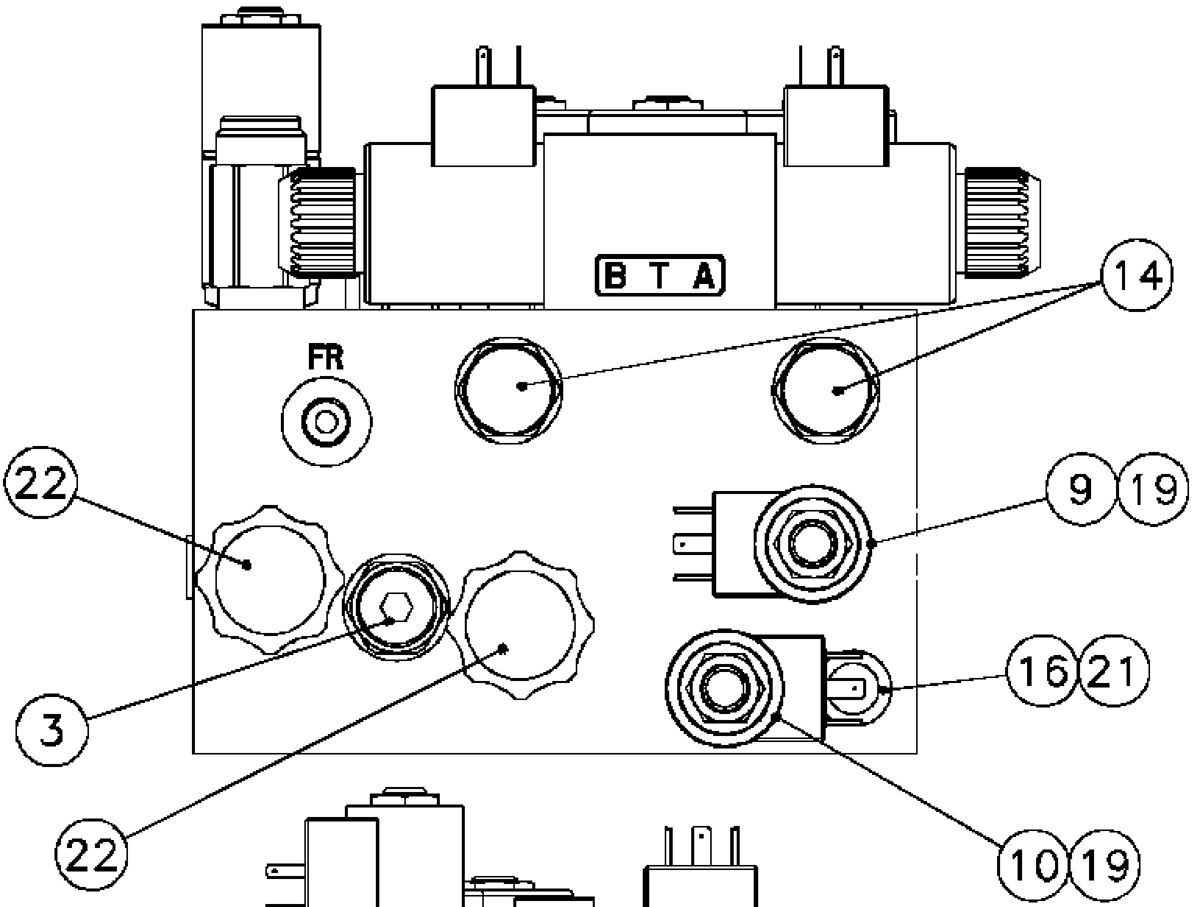
SPECIFICATIONS

HAULOTTE REFERENCE: 242 021 470
Maximum pressure : 240 bar Flow : 18 l / min

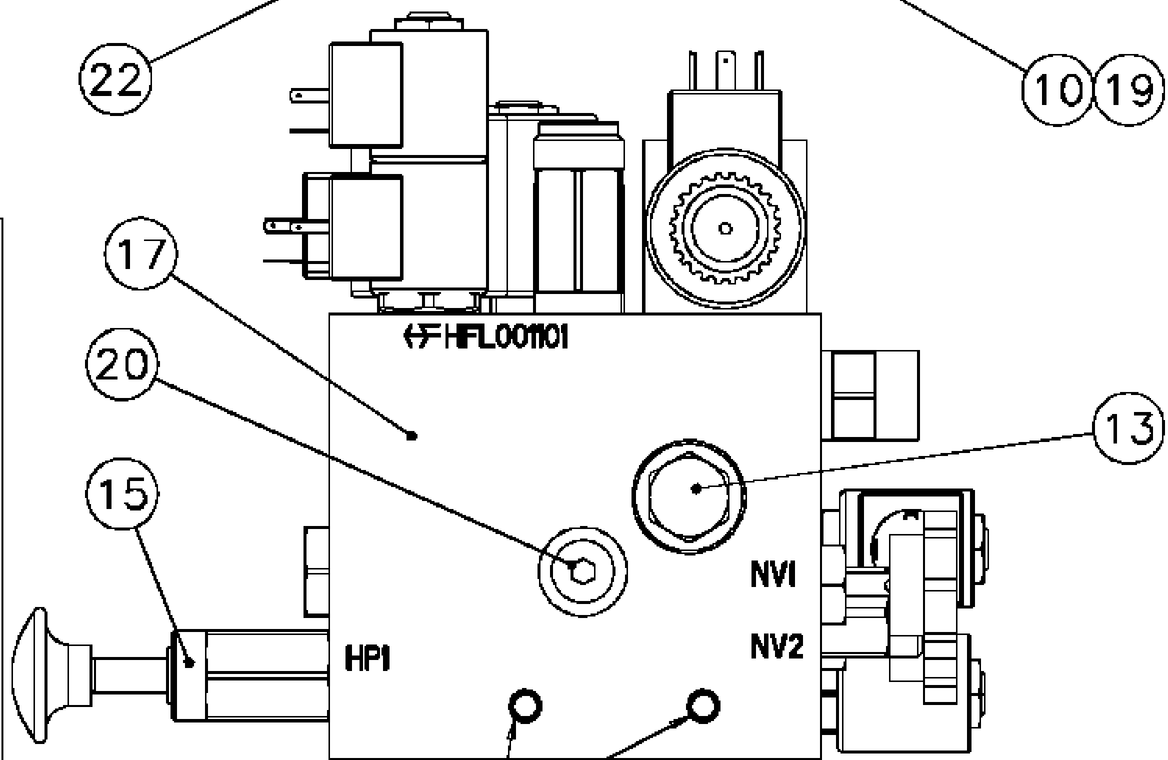


Pingueley-Haulotte	SPECIFICATION
Date : 13/03/01 | Page : 2/5	Numéro S5254 a
Machines: COMPACT8/10/12 OPTIMUM6/8 | Auteur: D. QUILLERE	Vérificateur: S. BEJI

REAR VIEW



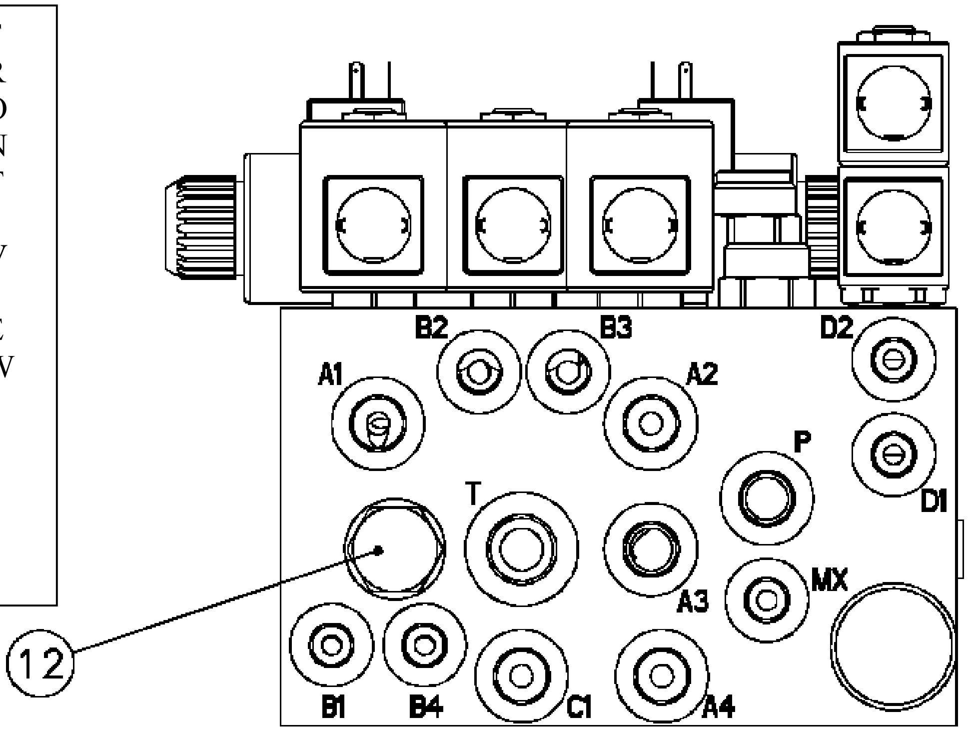
RIGHT SIDE VIEW



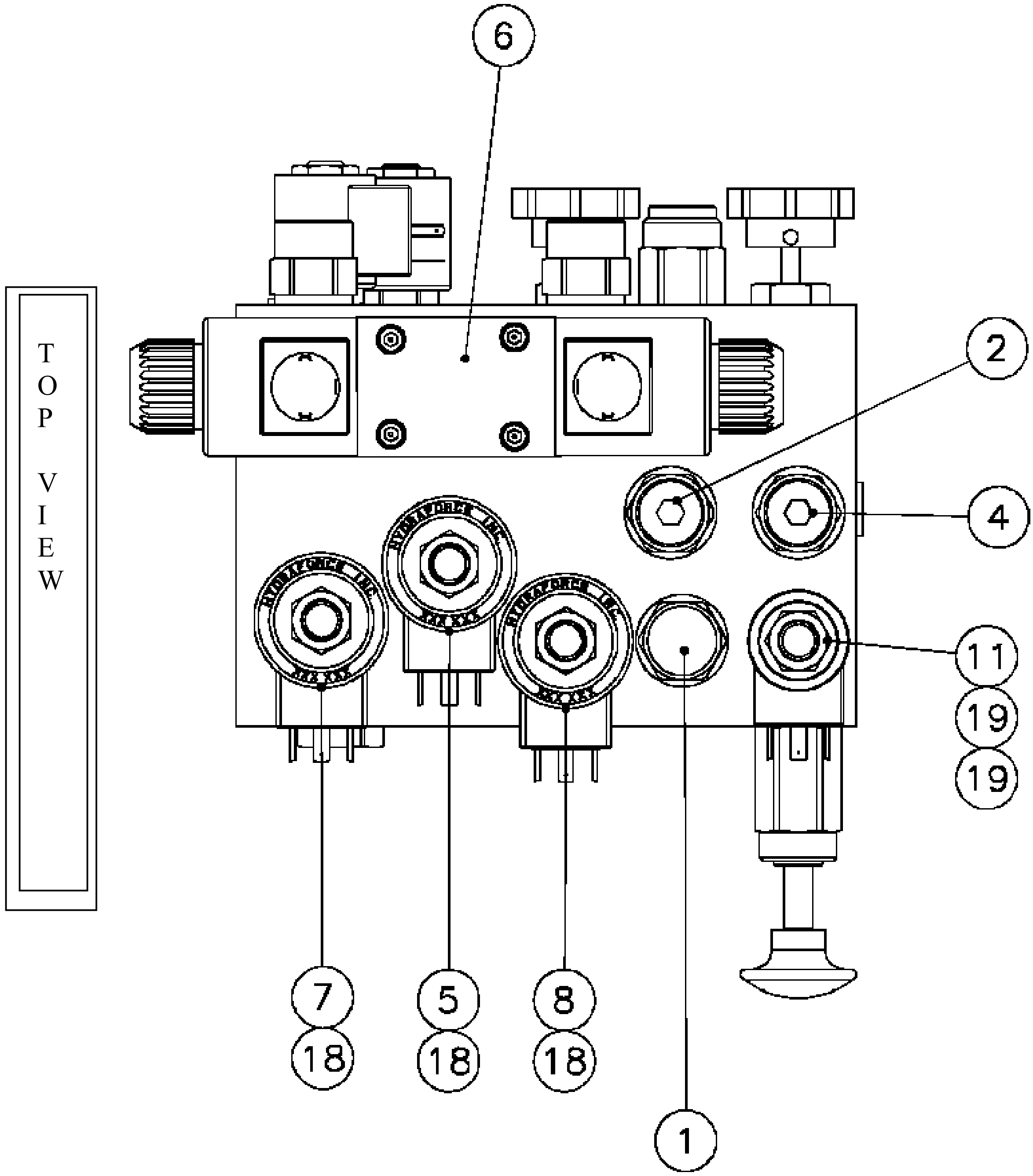
2 holes (tapped)
M8 Depth : 10

Pingue ly-Haulotte		SPECIFICATION
Date : 12/04/00	Page : 3/5	Numéro S5254 a
Machines: COMPACT8/10/12 OPTIMUM6/8	Auteur: D. QUILLERE	Vérificateur: S. BEJI

FRONT VIEW



Pingueley-Haulotte		SPECIFICATION
Date : 13/03/01	Page : 4/5	Numéro S5254 a
Machines: COMPACT8/10/12 OPTIMUM6/8	Auteur: D. QUILLERE	Vérificateur: S. BEJI



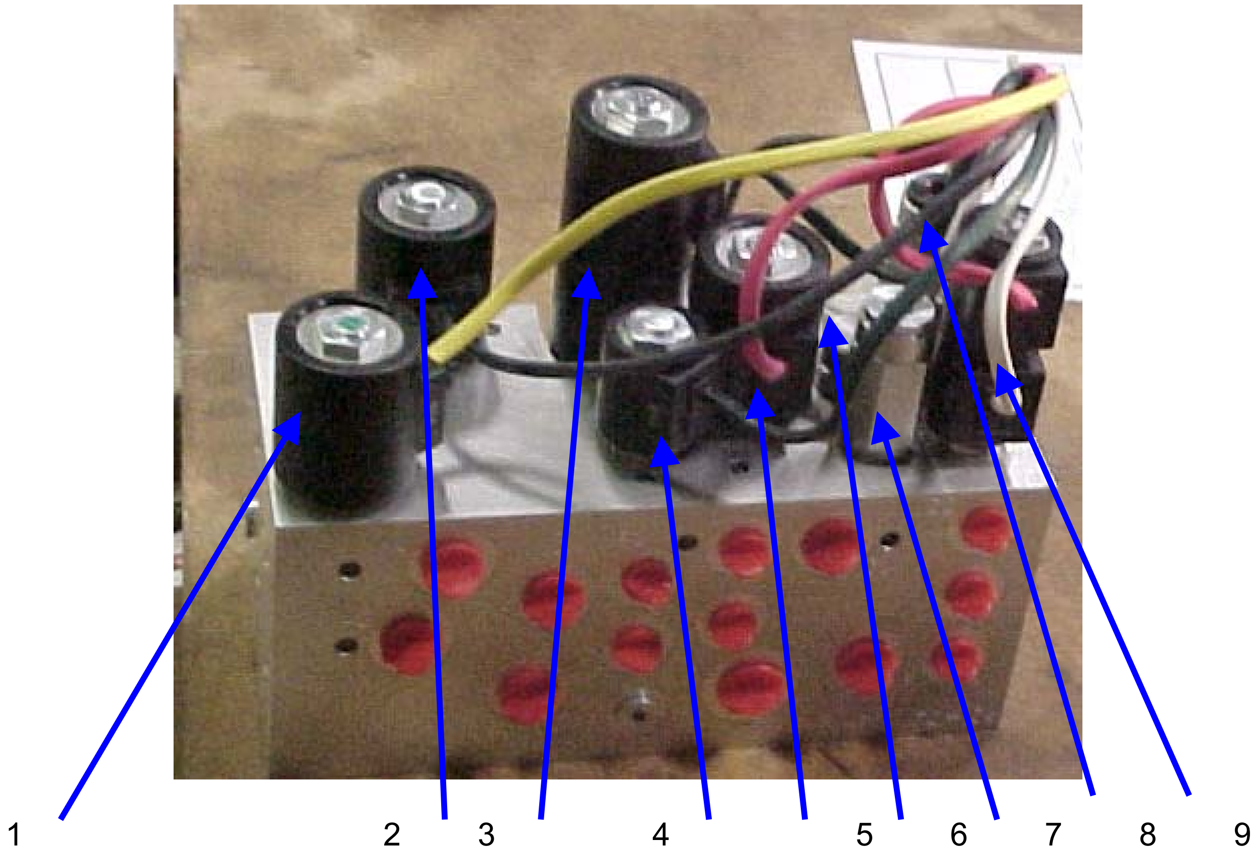
List of components (see table: Page 5/5 of Specification 5254a)

1- Priority valve (242 220 4980)
2- Main pressure regulating valve (242 120 3240)
3- Lifting pressure regulating valve (242 120 3250)
4- Steering pressure regulating valve (242 120 3350)
5- Screw-in cartridge electrovalve (244 050 7590)
6- Screw-in cartridge electrovalve (244 050 7600)
7- Screw-in cartridge electrovalve (244 050 7610)
8- Screw-in cartridge electrovalve (244 050 7620)
9- Screw-in cartridge electrovalve (244 050 7890)
10-Screw-in cartridge electrovalve (244 050 7630)
11-Screw-in cartridge electrovalve (244 050 7640)
12-Flow divider (242 040 2610)
13-Circuit selector (242 190 6370)
14-Balancing valve (242 220 4990)
15-Hand pump (242 160 8730)
16-Spray nozzle (Orifice plug) (242 070 3510)
17-Block (242 021 0520)
18-24V coil (244 021 0520)
19-24V coil (244 021 0530)
20-Port plug (242 020 9880)
21-Port plug (242 020 9890)
22-Safety valve (242 180 8630)

Pinguely-Haulotte	Date : 13/03/01 Page 5/5	SPECIFICATION Numero S5254 a

REP	DESIGNATION	REF. FOURNISSEUR	CODE HAULOTTE	QUANTITE
1	VALVE DE PRIORITE	FR10-3005F-O-N-M1.7	02902422204980	1
2	LIMITEUR DE PRESSION GENERAL	RV10-22H-O-N-35/M200	02902421203240	1
3	LIMITEUR DE PRESSION LEVAGE	RV10-22H-O-N-35/M180	02902421203250	1
4	LIMITEUR DE PRESSION DIRECTION	RV08-22H-O-N-26/M100	02902421203350	1
5	ELECTROVALVE EN CARTOUCHE 4/2 24V	SV10-40-O-N-00	02902440507590	1
6	ELECTROVALVE 4/3 CETOP 3 24V	HFA 3C3	02902440507600	1
7	ELECTROVALVE EN CARTOUCHE 24V 3/2	SV10-33-O-N-00	02902440507610	1
8	ELECTROVALVE EN CARTOUCHE 24V 4/2	SV10-44-O-N-00	02902440507620	1
9	ELECTROVALVE EN CARTOUCHE 24V 2/2	SV08-30-O-N-00	02902440507890	1
10	ELECTROVALVE EN CARTOUCHE 24V 2/2	SV08-20-O-N-00	02902440507630	1
11	ELECTROVALVE EN CARTOUCHE 24V 4/3	SV08-47A-O-N-00	02902440507640	1
12	DIVISEUR DE DEBIT	FD10-4004-O-N-1.5/1.5	02902420402610	1
13	SELECTEUR DE CIRCUIT	LS08-30-O-N	02902421906370	1
14	VALVE D'EQUILIBRAGE	1CE30N24S10.CB	02902422204990	2
15	POMPE A MAIN	HP10-20K-O-NN	02902421608730	1
16	GICLEUR	ORIFICE PLUG 6112047	02902420703510	1
17	BLOC	BLOCK 7372790	02902420210520	1
18	BOBINE 24V	COIL 6356024	02902440210520	3
19	BOBINE 24V	COIL 6306024	02902440210530	4
20	BOUCHON	PORT PLUG 6103006	02902420209880	1
21	BOUCHON	PORT PLUG 6103004	02902420209890	1
22	ROBINET	NV08-21E-O-N	02902421808630	2

3.1.2 MK4 block components



1 : YV3 244 050 7620 Parallel serial coupling Low speed / High speed travel

2 : YV4 244 050 7610 Parallel serial coupling Low speed / High speed travel

3 : YV2 244 050 8580 Solenoid valve selecting direction of travel

4 : YV6 244 050 8590 Pothole control solenoid valve

5 : YV1 244 050 7590 Travel/ lifting selection solenoid valve

6 : FRT 242 220 4980 Priority valve

7 : RV2 242 120 3240 Main pressure regulating valve

8 : RV3 242 120 3510 Lifting pressure regulating valve

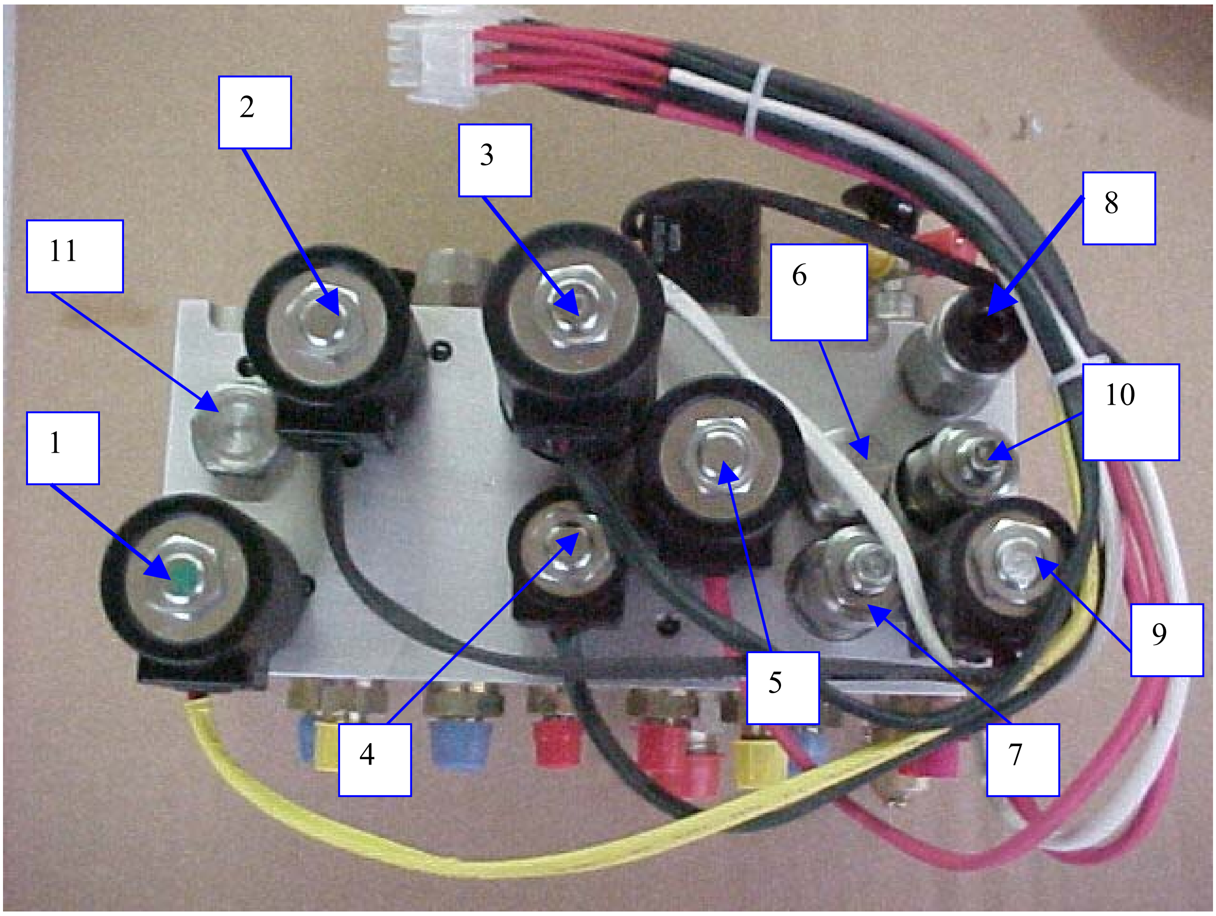
9 : YV 5 244 050 8570 Steering solenoid valve

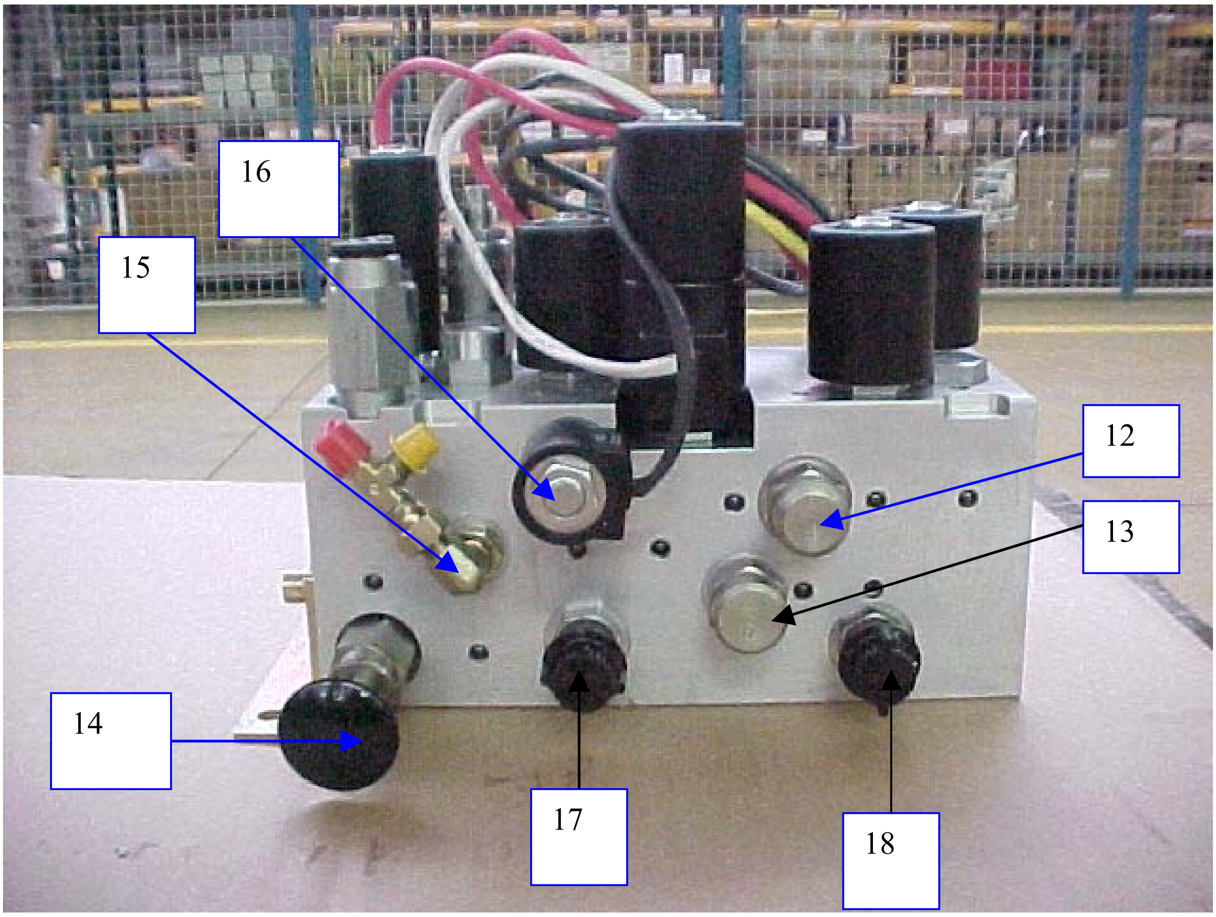
10 : RV1 242 120 3520 Steering pressure regulating valve

11 : FD1 242 040 2610 Travel flow divider

12 : CB2 242 220 5310 Balancing valve

13 : CB1 242 220 5310 Balancing valve


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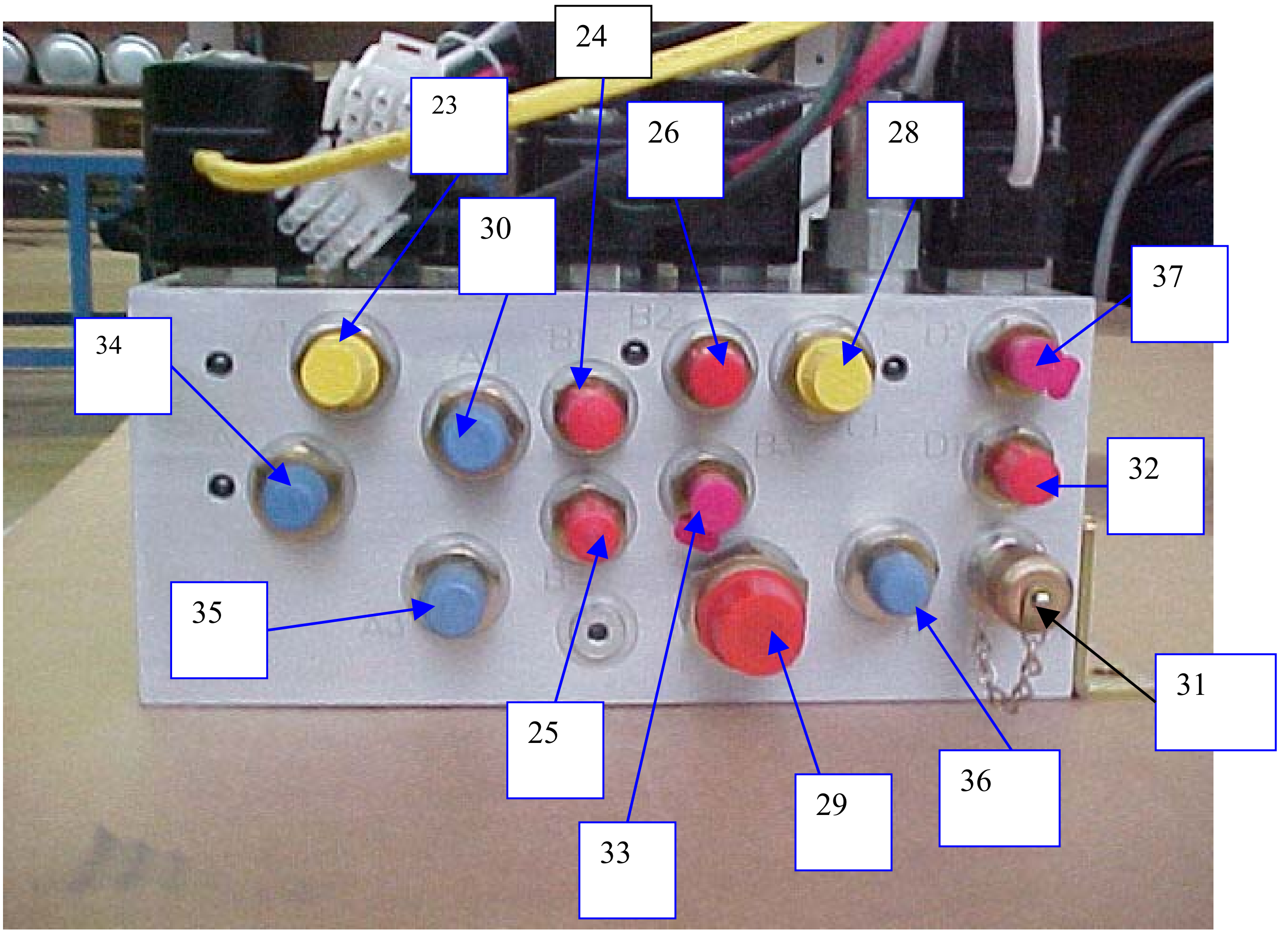
14 : 242 160 9590 Hand pump

15 : FR   Rear brakes power supply output

16 : YV3   244 050 8560 Lifting solenoid valve

17 : NV1   242 180 8630 Brake release discharge valve

18 : NV2   242 180 8630 Balancing valves by-pass valve



Block output

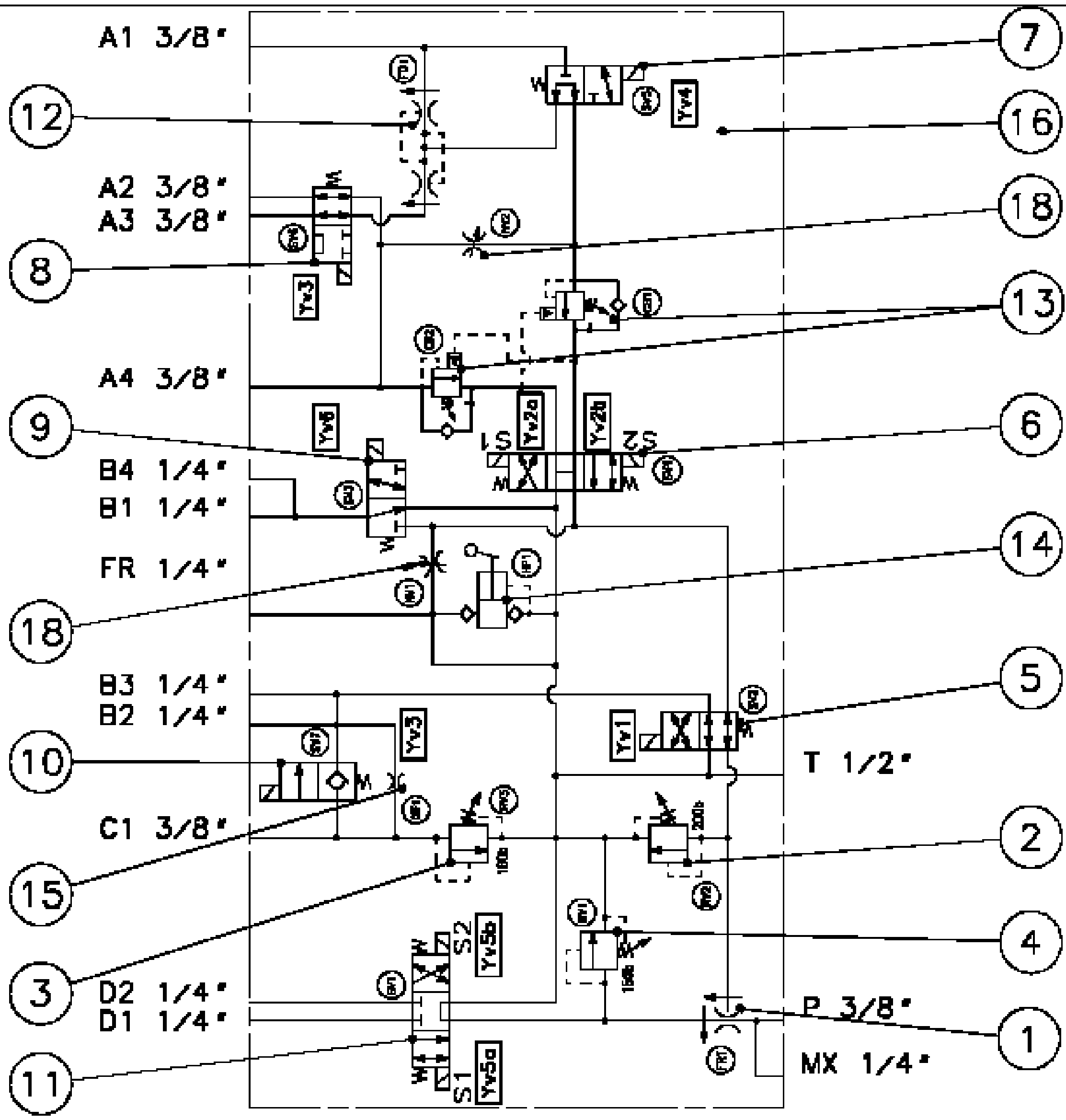
23 :   A1 Front left travel motors power supply output
24 :   B1 Pothole re-entry block output
25 :   B4 Pothole re-entry block output
26 :   B2 Potholes spreading out device
28 :   C1output of YV9 lifting power supply
29 :   T block output for returning to the tank through the hydraulic filter
30 :   A4 Front right travel motors output
31 :   MX   Minimess tap output – port gauge
32 :   D1 Steering cylinder power supply output
33 :   B3 Pothole spreading out device
34 :   A2 Front left travel motors power supply output
35 :   A3 Front right travel motors power supply output
36 :   P Block input taken on the block's output
37:    D2 Steering cylinder power supply output

MK4 block specification

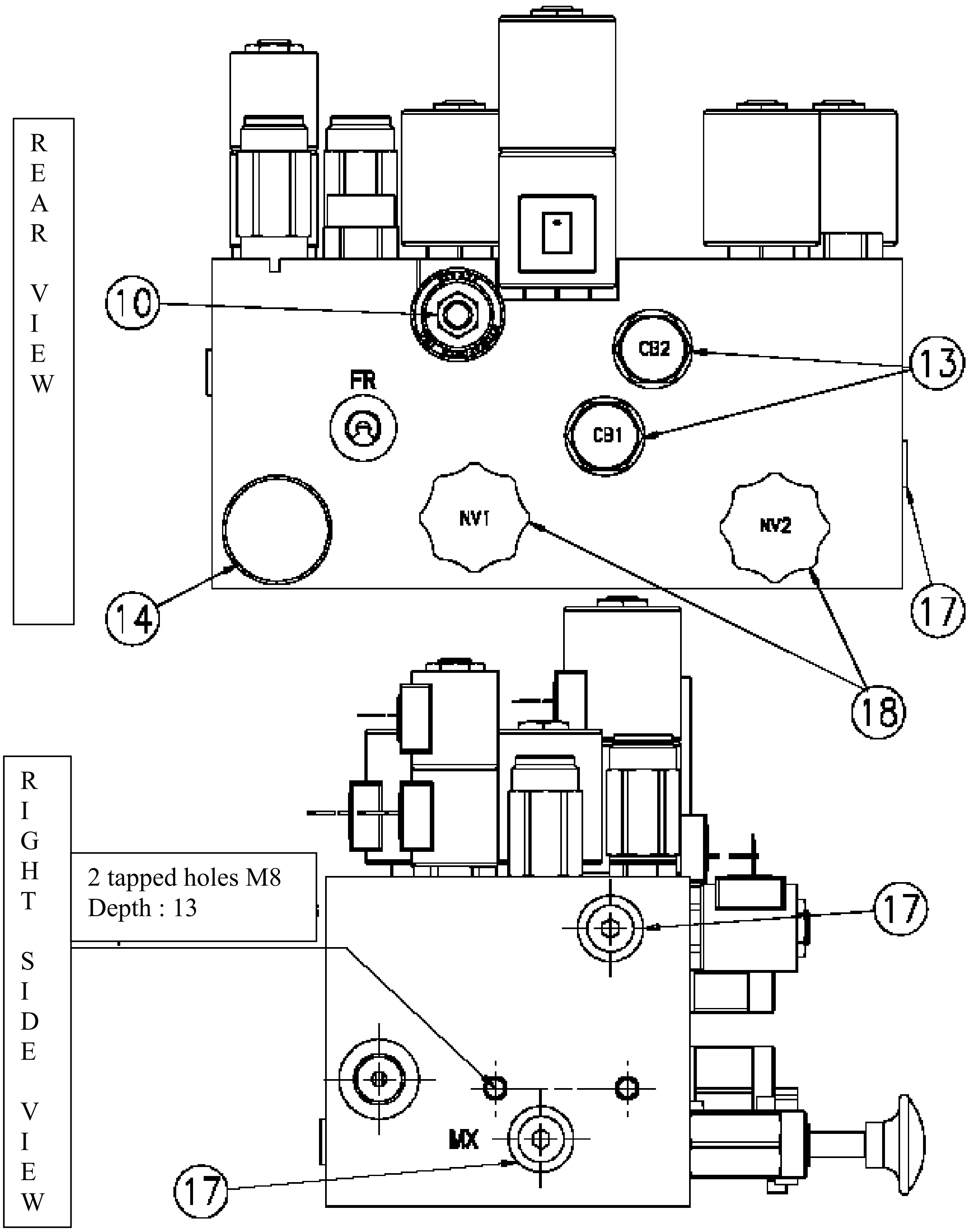
Pinguely-Haulotte		SPECIFICATION
Date : 01/07/03	Page : 1/5	Numéro S5625
Machines: COMPACT8/10/12 OPTIMUM6/8	Auteur: A. GOSSIAUX	Vérificateur: M. JEANNARD
Modifications		

SPECIFICATIONS

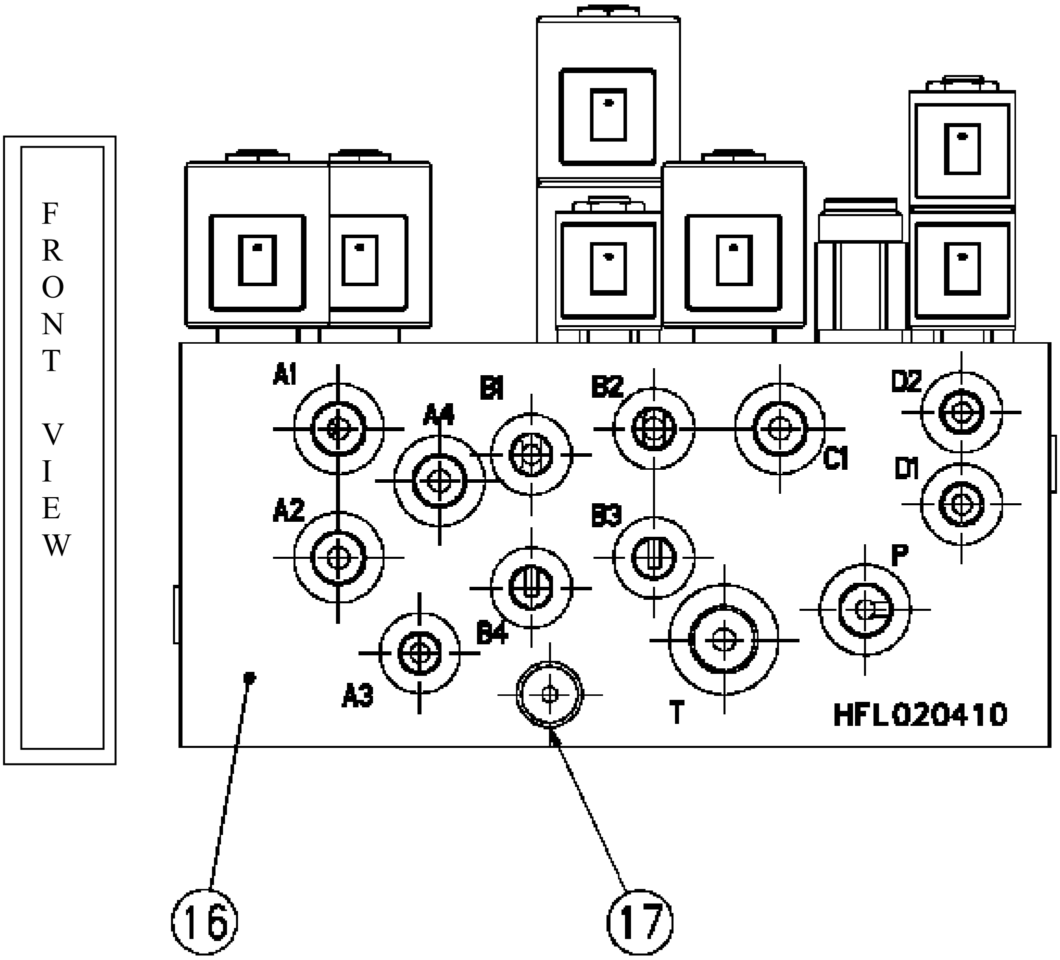
HAULOTTE code 242 021 2090 – Max. pressure 240 bar – Flow : 18 l / min



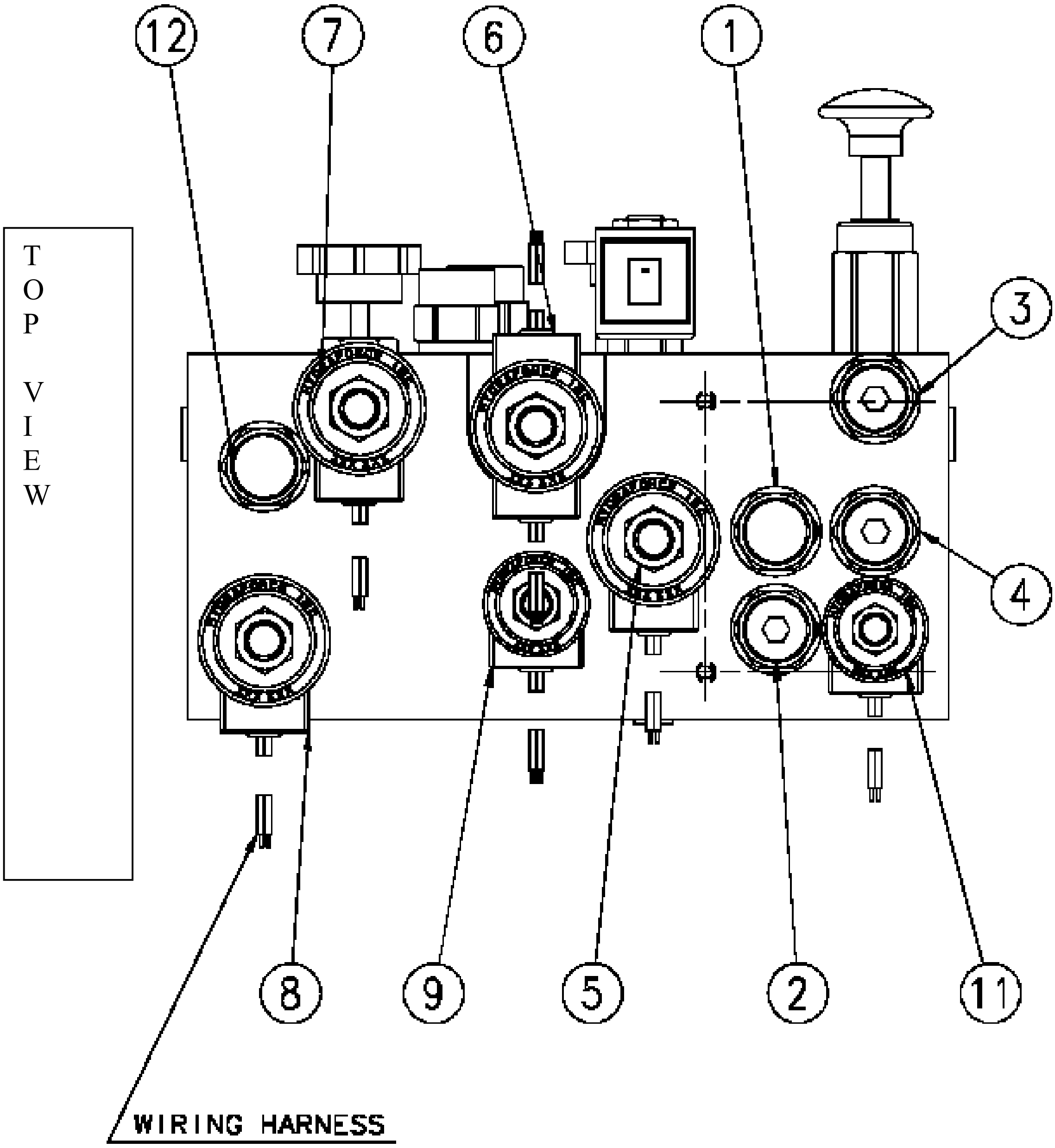
Pingeuly-Haulotte		SPECIFICATION
Date : 01/07/03	Page : 2/5	Numéro S5625
Machines: COMPACT8/10/12 OPTIMUM6/8	Auteur: A. GOSSIAUX	Vérificateur: M. JEANNARD



Pingucly-Haulotte		SPECIFICATION
Date : 01/07/03	Page : 3/5	Numéro S5625
Machines: COMPACT6/10/12 OPTIMUM6/8	Auteur: A. GOSSIAUX	Vérificateur: M. JEANNARD



Pingue ly-Haulotte		SPECIFICATION
Date : 01/07/03	Page : 4/5	Numéro S5625
Machines: COMPACT8/10/12 OPTIMUM6/8	Auteur: A. GOSSIAUX	Vérificateur: M. JEANNARD



Pinguely-Haulotte

Date : 13/03/01

SPECIFICATION

Numero S5625

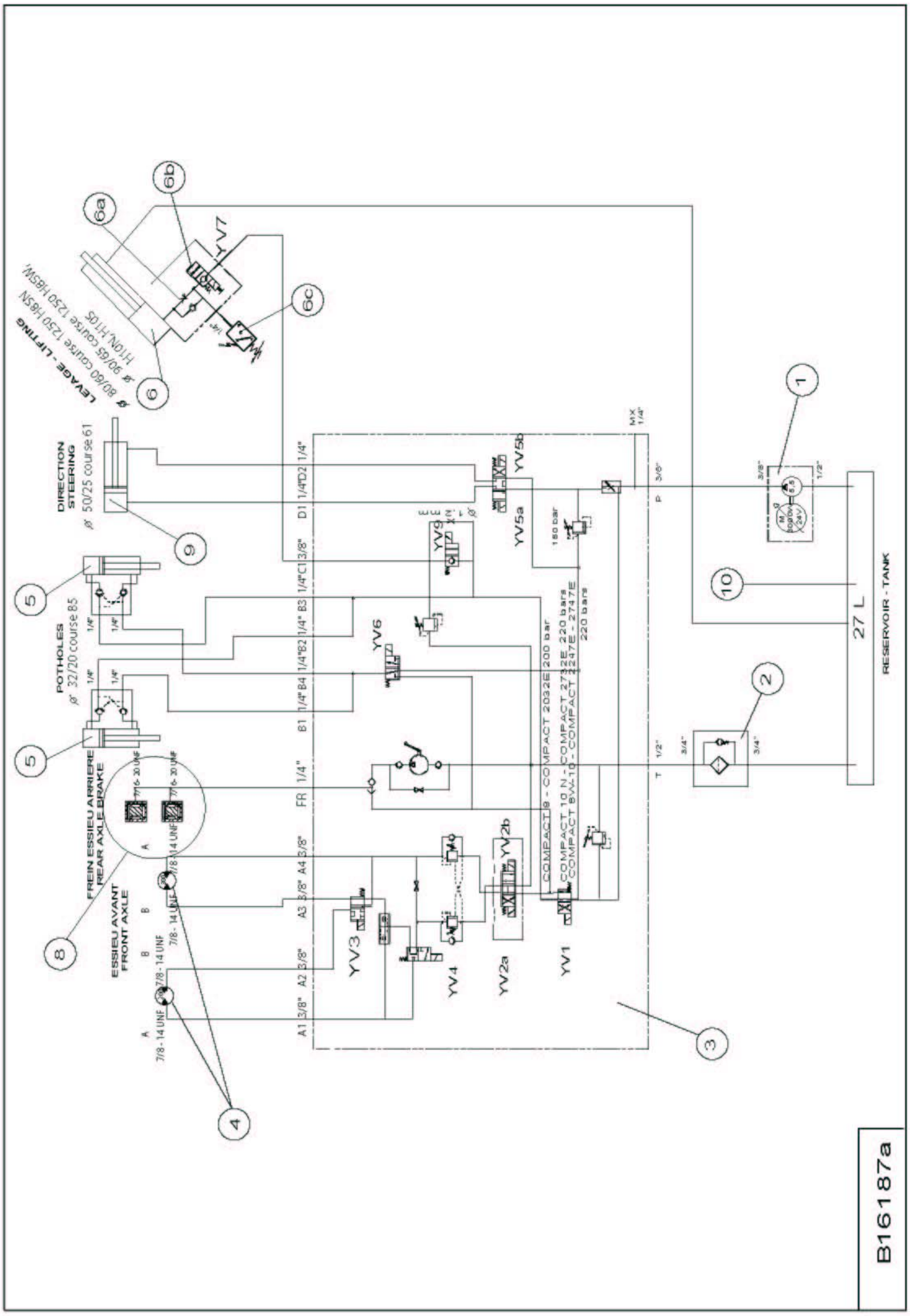
REP	DESIGNATION	REF. FOURNISSEUR	CODE HAULOTTE	QUANTITE
1	VALVE DE PRIORITE	FR10-3007F-0-N-M1,7	2422204980	1
2	LIMITEUR DE PRESSION GENERAL	RV10-22H-0-N-35/M200	2421203240	1
3	LIMITEUR DE PRESSION LEVAGE	RV08-22H-0-N-35/M180	2421203510	1
4	LIMITEUR DE PRESSION DIRECTION	RV08-22H-0-N-26/M150	2421203520	1
5	ELECTROVALVE EN CARTOUCHE 4/2 24V	SV10-40-0-N-00	2440507590	1
6	ELECTROVALVE EN CARTOUCHE 24V	SV10-47B-0-N-00	2440508580	1
7	ELECTROVALVE EN CARTOUCHE 24V 3/2	SV10-33-0-N-00	2440507610	1
8	ELECTROVALVE EN CARTOUCHE 24V 4/2	SV10-44-0-N-00	2440507620	1
9	ELECTROVALVE EN CARTOUCHE 24V 2/2	SV08-30-0-N-00	2440508590	1
10	ELECTROVALVE EN CARTOUCHE 24V 2/2	SV08-2020-N-00	2440508560	1
11	ELECTROVALVE EN CARTOUCHE 24V 4/3	SV08-47A-0-N-00	2440508570	1
12	DIVISEUR DE DEBIT	FD10-4004-0-N-1.5/1.5	2420402610	1
13	VALVE D'EQUILIBRAGE	1CE30N32S10.CB	2422205310	2
14	POMPE A MAIN	HP10-2002-0-N	2421609590	1
15	GICLEUR	ORIFICE PLUG 6112047	2420703510	1
16	BLOC	BLOCK 7376090 F/HF	2420212100	1
17	BOUCHON	SAE PLUG 6103004	2420209890	4
18	ROBINET	NV08-21E-0-N	2421808630	2

List of components (see table: Page 5/5 of Specification 5625)

1- Priority valve (242 220 4980)
2- Main pressure regulating valve (242 120 3240)
3- Lifting pressure regulating valve (242 120 3510)
4- Steering pressure regulating valve (242 120 3520)
5- Screw-in cartridge electrovalve (244 050 7590)
6- Screw-in cartridge electrovalve (244 050 8580)
7- Screw-in cartridge electrovalve (244 050 7610)
8- Screw-in cartridge electrovalve (244 050 7620)
9- Screw-in cartridge electrovalve (244 050 8590)
10-Screw-in cartridge electrovalve (244 050 8560)
11-Screw-in cartridge electrovalve (244 050 8570)
12-Flow divider (242 040 2610)
13-Balancing valve (242 190 5310)
14-Hand pump (242 160 9590)
15-Spray nozzle (Orifice plug) (242 070 3510)
16- Block (242 021 2100)
17-Plug (242 020 9890)
18-Safety valve (242 180 8630)

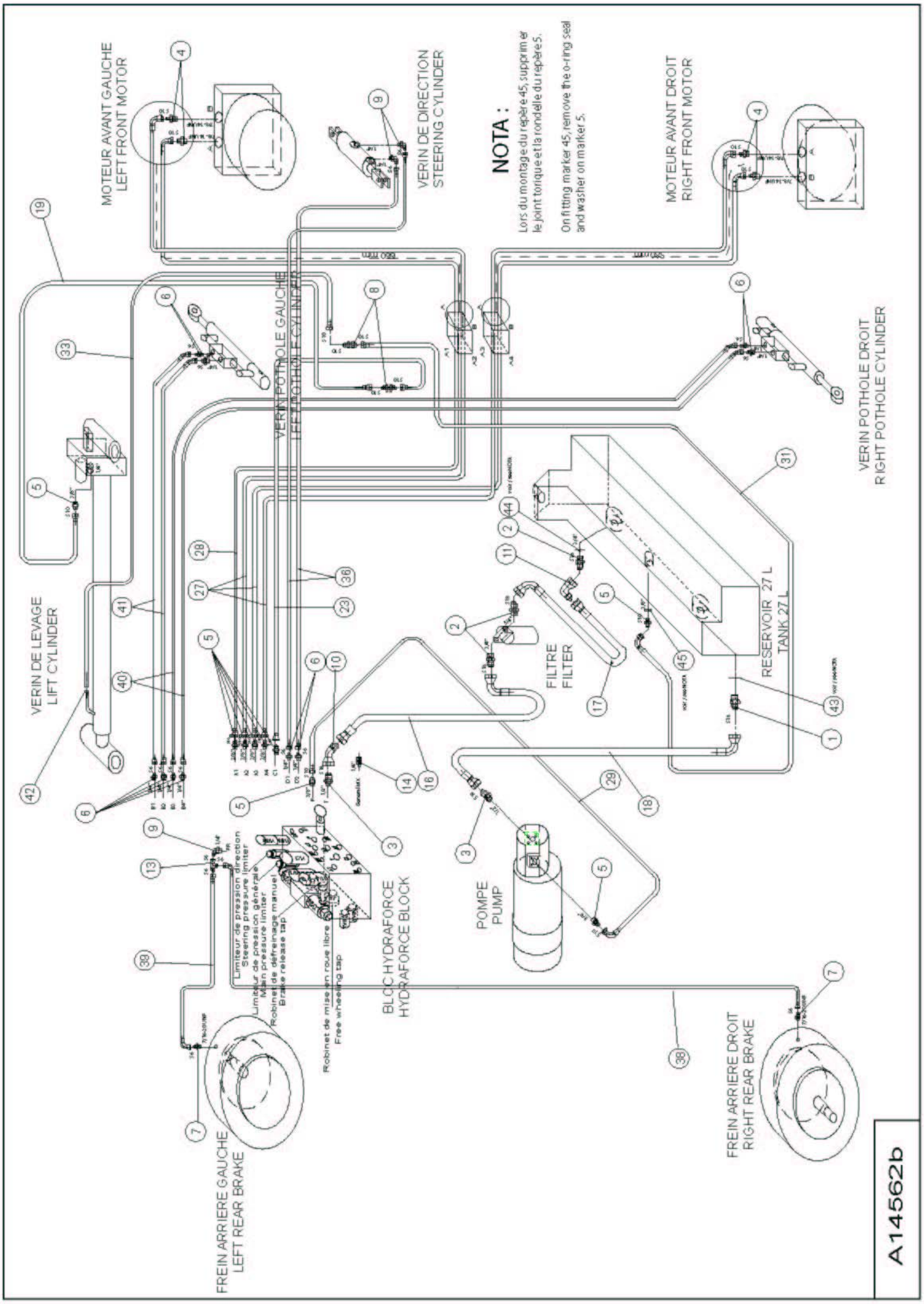
3.1.3 Hydraulic diagrams

Compact 8, 8W, 10N / 10 : hydraulic diagram



Part	Marker	Qty	Comments
2420701800 – Pump motor unit 3000W 24V DC	1	1	
2427010430 – Oil filter 3/4 BSPP	2	1	
2420212090 - MK4 distribution block	3	1	
2431202050 – Hydraulic motor 300CC - SP.5122	4	2	
118C148380 – Pothole cylinder	5	2	
120C149400 – Lifting cylinder SP.5044	6	1	(Compact 8W, 10N / 10)
118C149390 – Lifting cylinder	6	1	(Compact 8)

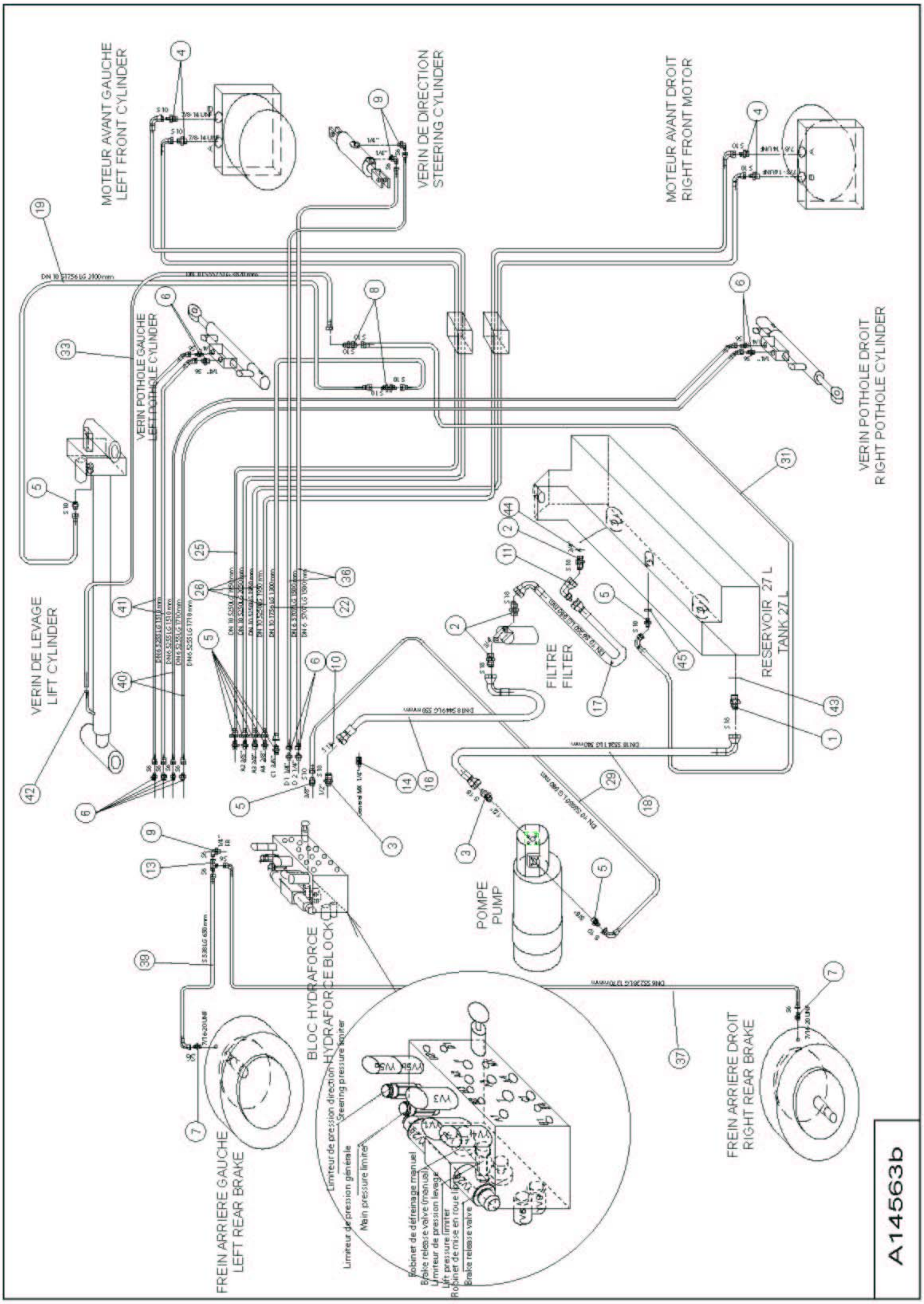
Compact 8 : hydraulic installation



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Part	Marker	Qty	Comments
2369110220 – Union piece M.JIC37 (18)M 1 BSPP	1	1	
2369117210 - Union piece M.JIC 37	2	3	
2369117190 - Union piece M.JIC 37	3	2	
2369111430 - Union piece male JIC37(10)M.7/8-14 UNF	4	4	
2369117360 - Union piece M JIC37	5	9	
2369117120 - Union piece M.JIC 37	6	10	
2369111440 - Union piece male JIC37(6)M.7/16-20 UNF	7	2	
2369109100 - Union piece TC M.JIC 37 (10)	8	2	
2369132090 - Bend JIC 37 90°	9	3	
2369135180 - Bend JIC 37 90°	11	1	
2369147000 – Equal T piece JIC 37	13	1	
2441604150 – Minimess tap 1/4' G	14	1	
2369071110 - Hose S449 0,55m	15	1	
2369071690 - Hose SP 5241 lg 600	17	1	
2369071700 - Hose SP 5241 lg 540	18	1	
2369070820 - Hose SP.1756 3,100m	19	1	
2369071350 - Hose S1756 1,25m	23	1	
2369071740 - Hose SP 5250 1,800m	27	3	
2369071750 - Hose SP 5250 1,650m	28	1	
2369071760 - Hose SP 5250 0,930m	29	1	
2369071770 - Hose SP 5239 0,920m	31	1	
2369071420 - Hose S5175 3,82m	33	1	
2369069640 - Hose S1707 1,51m	36	2	
2369071790 - Hose SP. 5238 1,030m	38	1	
2369071800 - Hose SP. 5238 0,530m	39	1	
2369071810 - Hose SP. 5255 1,1710m	40	2	
2369071820 - Hose SP. 5255 1,510m	41	2	
2389002540 - Collar	42	1	
118D160580 - Washer Ø41,5/33 ep=2	43	1	
118D160570 - Washer Ø36/27 ep=2	44	1	
118D160560 - Washer Ø23,5/17 ep=2	45	1	

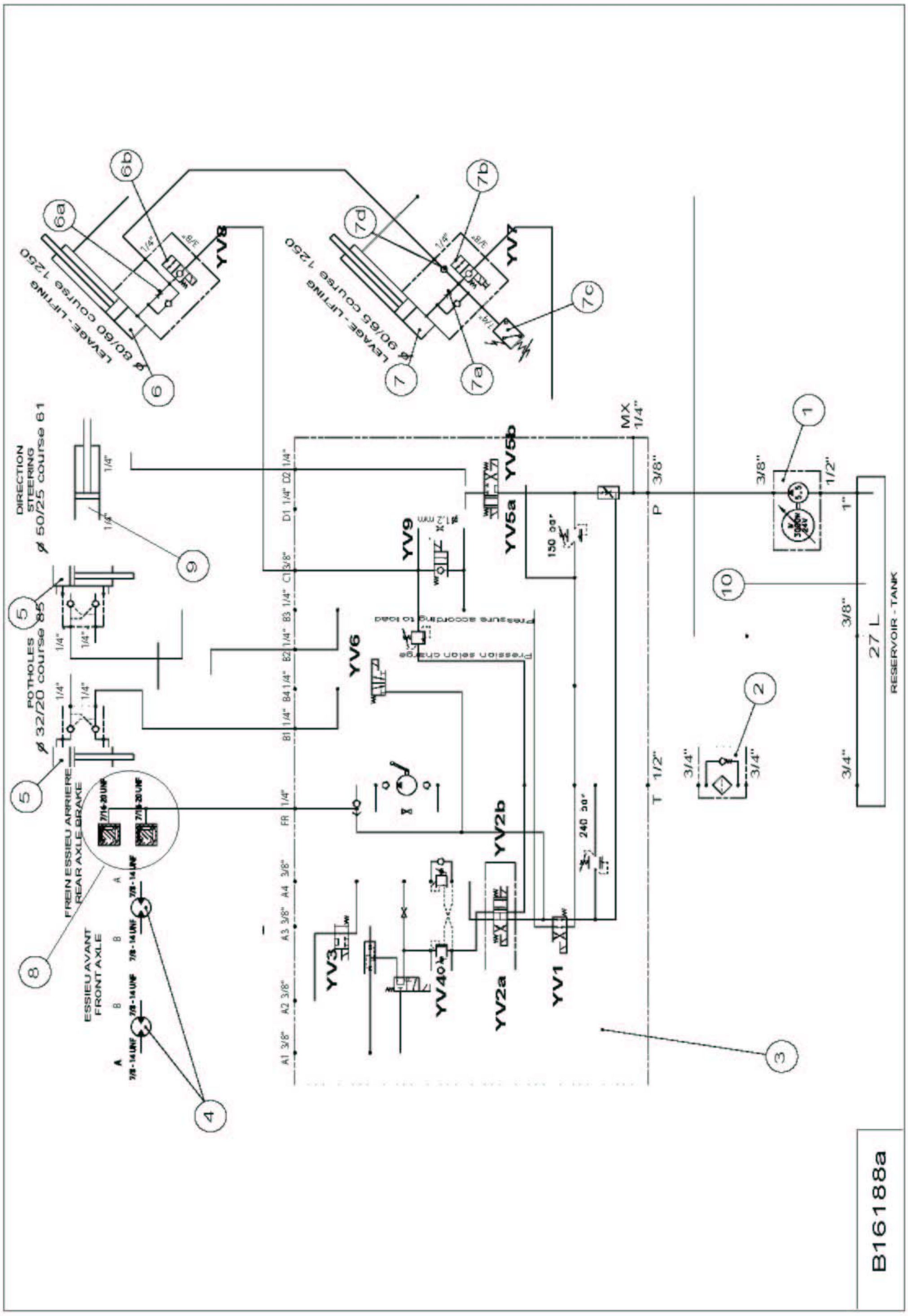
Compact 8W, 10N et 10 hydraulic installation



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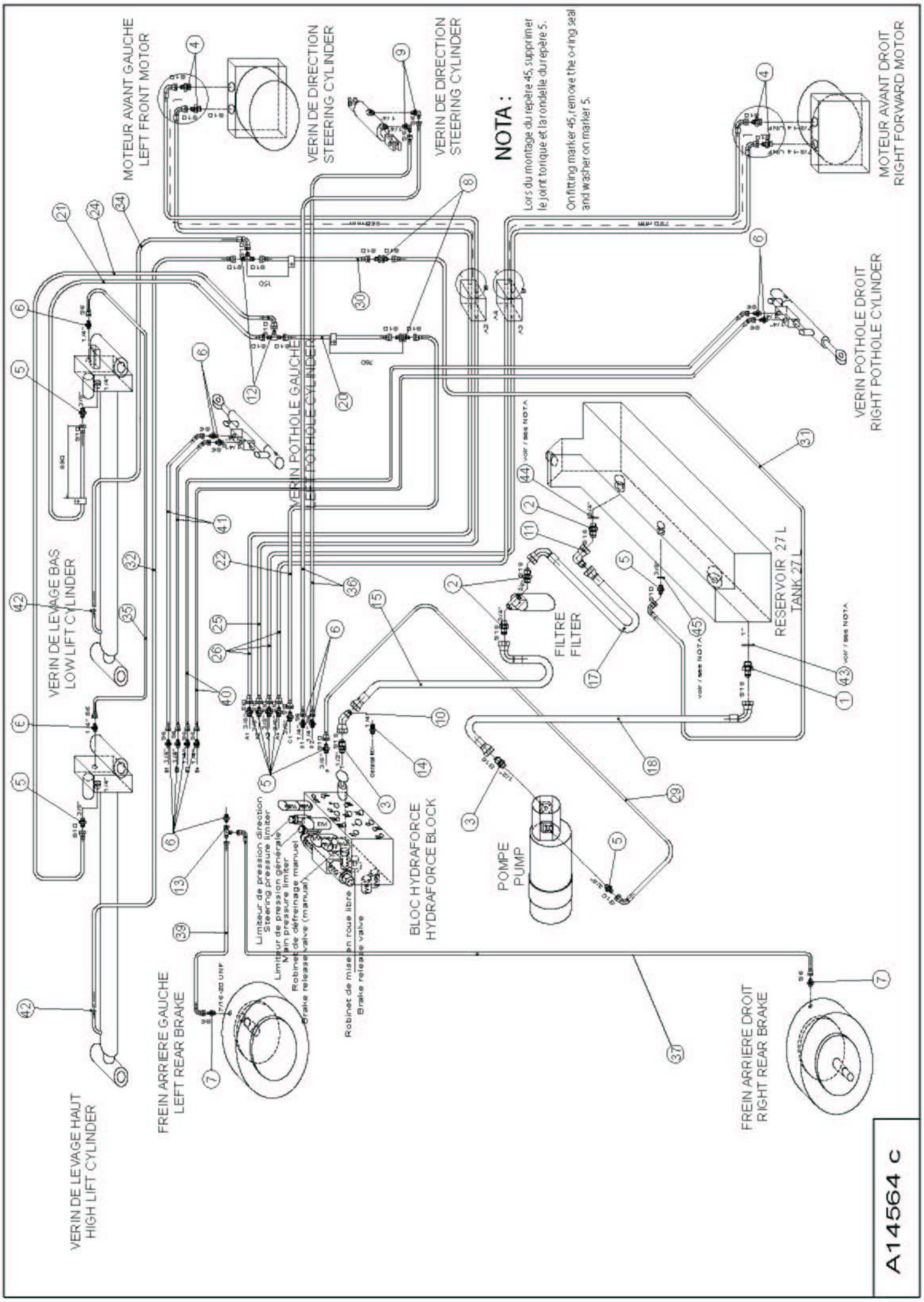
Part	Marker	Qty	Comments
2369110220 – Union piece M.JIC37 (18)M 1 BSPP	1	1	
2369117210 - Union piece M.JIC 37	2	3	
2369117190 – Union piece M.JIC 37	3	2	
2369111430 – Union piece male JIC37(10)M.7/8-14 UNF	4	4	
2369117360 – Union piece M JIC37	5	9	
2369117120 – Union piece M.JIC 37	6	10	
2369111440 – Union piece male JIC37(6)M.7/16-20 UNF	7	2	
2369109100 - Union piece TC M.JIC 37 (10)	8	2	
2369132090 - Bend JIC 37 90°	9	3	
2369135180 – Bend JIC 37 90°	11	1	
2369147000 – Equal T piece JIC 37	13	1	
2441604150 - Minimess tap 1/4' G	14	1	
2369071110 - Hose S449 0,55m	15	1	
2369071690 - Hose SP 5241 lg 600	17	1	
2369071700 - Hose SP 5241 lg 540	18	1	
2369070820 - Hose SP.1756 3,100m	19	1	
2369058900 - Hose SP.1756 1,3m	22	1	
2369071650 - Hose SP. 5250 2,050m	25	1	
2369071730 - Hose S5239 Lg 1950	26	3	
2369071760 - Hose SP 5250 0,930m	29	1	
2369071770 - Hose SP 5239 0,920m	31	1	
2369071420 - Hose S5175 3,82m	33	1	
2369069640 - Hose S1707 1,51m	36	2	
2369071780 - Hose S5238 Lg 1370	37	1	
2369071800 - Hose SP. 5238 0,530m	39	1	
2369071810 - Hose SP. 5255 1,1710m	40	2	
2369071820 - Hose SP. 5255 1,510m	41	2	
2389002540 - Collar	42	1	
118D160580 - Washer Ø41,5/33 ep=2	43	1	
118D160570 - Washer Ø36/27 ep=2	44	1	
118D160560 - Washer Ø23,5/17 ep=2	45	1	

Compact 12 : hydraulic diagram



Part	Marker	Qty	Comments
2420701800 – Motor pump unit 3000W 24V DC	1	1	
2427010430 – Oil filter 3/4 BSPP	2	1	
2420212090 - MK4 distribution block	3	1	
2431202050 – Hydraulic motor 300CC - SP.5122	4	2	
118C148380 - Pothole cylinder	5	2	
118C150590 – Lifting cylinder	6	1	
121C156140 – Lifting cylinder 65/90	7	1	

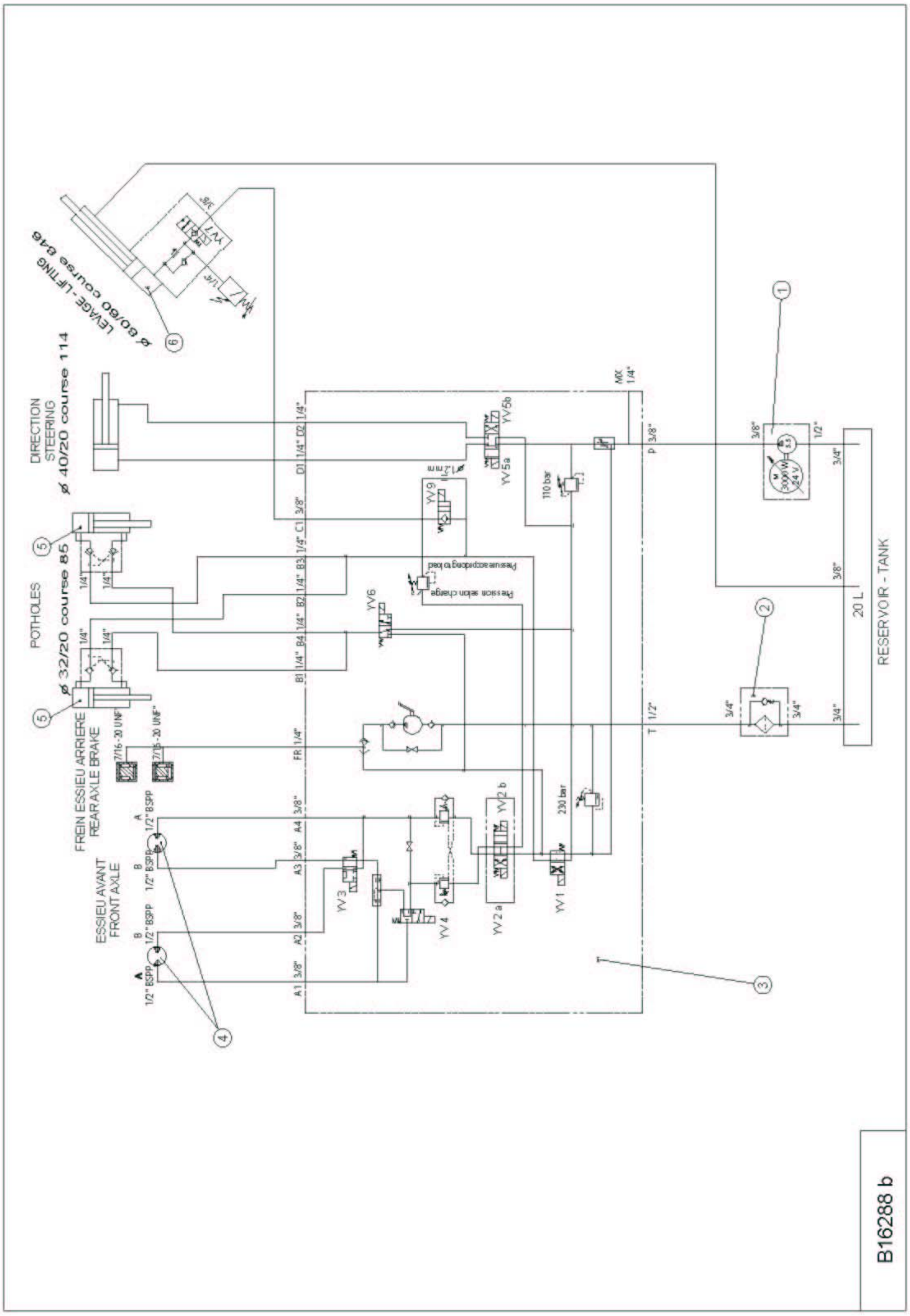
Compact 12: hydraulic installation



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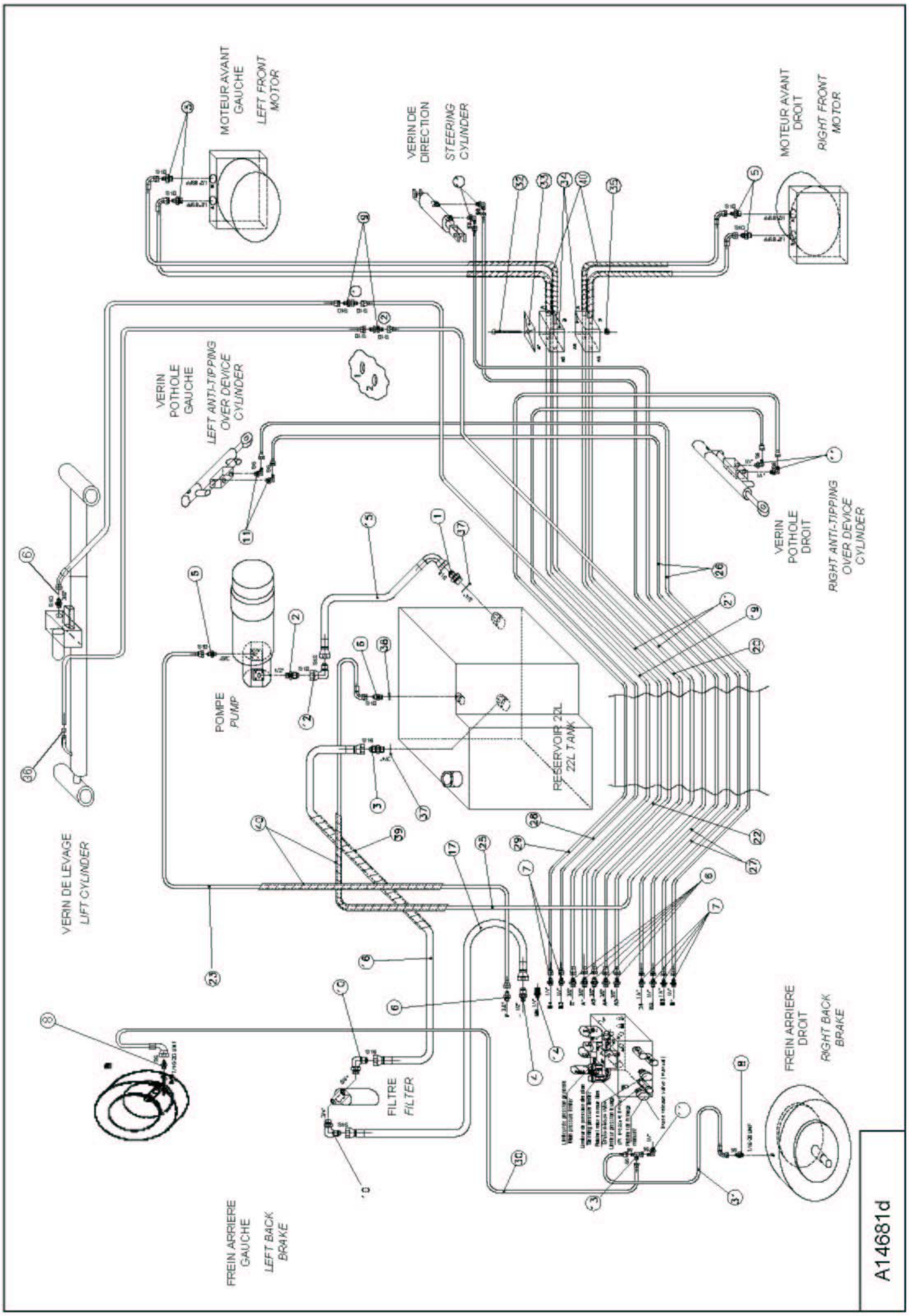
Part	Marker	Qty	Comments
2369110220 – Union piece M.JIC37 (18)M 1 BSPP	1	1	
2369117210 - Union piece M.JIC 37	2	3	
2369117190 - Union piece M.JIC 37	3	2	
2369111430 - Union piece male JIC37(10)M.7/8-14 UNF	4	4	
2369117360 - Union piece M JIC37	5	9	
2369117120 - Union piece M.JIC 37	6	12	
2369111440 - Union piece male JIC37(6)M.7/16-20 UNF	7	2	
2369109100 - Union piece TC M.JIC 37 (10)	8	2	
2369132090 – Bend JIC 37 90°	9	3	
2369135180 - Bend JIC 37 90°	11	1	
2369141100 – Equal T-piece M JIC 37	12	2	
2369147000 – Equal T-piece JIC 37	13	1	
2441604150 – Minimess tap 1/4' G	14	1	
2369071110 – Hose S449 0,55m	15	1	
2369071690 - Hose SP 5241 lg 600	17	1	
2369071700 - Hose SP 5241 lg 540	18	1	
2369006290 - Hose	20	1	
2369071390 - Hose	21	1	
2369058900 - Hose SP.1756 1,3m	22	1	
2369071650 - Hose SP. 5250 2,050m	25	1	
2369071730 - Hose S5239 Lg 1950	26	3	
2369071760 - Hose SP 5250 0,930m	29	1	
2369059440 - Hose SP.1786 1,2m	30	1	
2369071770 - Hose SP 5239 0,920m	31	1	
2369072930 - Hose SP.5175 LG.6800	32	1	
2369071830 - Hose S5256 2,42m	34	1	
2369069640 - Hose S1707 1,51m	36	2	
2369071780 - Hose S5238 Lg 1370	37	1	
2369071800 - Hose SP. 5238 0,530m	39	1	
2369071810 - Hose SP. 5255 1,1710m	40	2	
2369071820 - Hose SP. 5255 1,510m	41	2	
2389002540 - Collar	42	1	
118D160580 - Washer Ø41,5/33 ep=2	43	1	
118D160570 - Washer Ø36/27 ep=2	44	1	
118D160560 – Washer Ø23,5/17 ep=2	45	1	

Optimum 6 - Optimum 8 : Hydraulic diagram



Part	Marker	Qty	Comments
2420703820 – Motor pump unit 3KW 24V	1	1	
2427010430 – Oil filter 3/4 BSPP	2	1	
2420212090 - MK4 distribution block	3	1	
2431202110 – Hydraulic motor 162cm3	4	2	
118C149380 - Cylinder SP.5090-5093	5	2	
118C170040 – Lifting cylinder	6	1	

Optimum 6 - Optimum 8 : Hydraulic installation



A14681d - Parts	Marker	Qty	Comments
2369117210 – Union piece M.JIC 37	1	1	
2369117190 - Union piece M.JIC 37	2	1	
2369110160 - Union piece M.JIC37 (16)M 3/4 BSPP	3	1	
2369110170 - Union piece M.JIC37 (16)M 1/2 BSPP	4	1	
2369117370 - Union piece JIC 37 BS	5	4	
2369117360 - Union piece M JIC37	6	9	
2369117120 - Union piece M.JIC 37	7	6	
2369111440 - Union piece male JIC37(6)M.7/16-20 UNF	8	2	
2369109100 - Union piece TC M.JIC 37 (10)	9	2	
2369132200 – Adjustable bend M.JIC37	10	2	
2369132090 - Bend 7 90°	11	7	
2369135180 – Bend 37 90°	12	1	
2369147000 – Equal T piece JIC 37	13	1	
2441604150 – Minimess tap 1/4' G	14	1	
2369073050 - Hose S5241 Lg 290 D-C90	15	1	
2369073040 - Hose S5028 Lg 1130 D-D	16	1	
2369073030 - Hose S5028 Lg 420 D-D	17	1	
2369073310 - Hose S5415 Lg 2050 D-C135	18	1	
2369070890 - Hose SP.1756 1,750m	19	1	
2369071650 - Hose SP. 5250 2,050m	20	1	
2369073000 - Hose S5250 Lg 2000 D-C90	21	2	
2369072890 - Hose S5250 Lg1850	22	1	
2369058550 - Hose S1756 LG 1m	23	1	
2369073080 - Hose S1756 Lg 2350 D-D	24	1	
2369073300 - Hose S5250 Lg 2400 D-C90	25	1	
2369071160 - Hose S1707 2,19m	26	2	
2369073020 - Hose S1707 Lg 1660 D-D	27	2	
2369070260 - Hose S1707 Lg 1550 D-D	28	1	
2369072380 - Hose S1707 1.47m	29	1	
2369072530 - Hose Lg 860 D-C90	30	1	
2369071800 - Hose SP. 5238 0,530m	31	1	
2301231750 - Screw H M8X80/22 CL8.8 ZB	32	1	
2421608490 – Protective plate GD2-D	33	1	
2389003250 - Collar 216/16 PP	34	2	
2349221500 - Nut M8 CL8ZB	35	1	
2389002540 - Collar	36	1	
118D160570 - Washer Ø36/27 ep=2	37	2	
118D160560 - Washer Ø23,5/17 ep=2	38	1	
2421903390 – Flexible plastic spiral 900952-12	39	1	0,31m
2421903430 - Flexible plastic spiral	40	2	2 m

3.2 - ELECTRIC COMPONENTS

3.2.1 Chassis equipment

RCH : Battery charger

SB1 : Main switch including battery-cut-off function.

U1 : Controller.

SA1 : Key contactor : selection of the command either on the top console with the possibility to take off the key, or on the turntable console with no need to maintain the command.

SA2 : Command switch driving the platform up or down. 14 Up, 15 Down.

SQ1 : Low position switch : wire 28 ; 1 = low position of the platform ; 0 = high position of the platform.

SQ3 : End of lifting position switch; wire 29, gets on position 0 at the end of lifting and cuts the lifting command.

SQ4 : Position switch to stop traveling at a platform height of 8 meters from the floor: wire 31.

SQ5 & SQ6 : Position switch to control the extension of potholes. The wire 31 of this circuit must be closed before SQ1 gets on 0 ; otherwise it prevents lifting and traveling. Lowering is the only solution left.

SQ10 : Slope : wire 12 ; 1 at rest ; 0 = tilt

SP1 : Pressure switch wires 28

Fuses block command

FU2 : 10A : command fuse : protection of solenoid valves and horn.

FU3 : 10A : command fuse to feed the command circuit. It protects the whole command circuit.

FU4 :10A : Fuse protecting the feeding of the optional circuit of working head lights or flashing lights.

FU1 : 250A Power protection fuse.

M1 : Pump motor 24V 3000W.

PT1 : Multifunction indicator (hour recorder,
unloading indicator and numeric indicator of codes statements)

3.2.2 Equipment of the upside console

U2 : The serial card allows compiling the different elements of the console in order to get a digital transmission signal.

SM1 : Joystick

SA3 : Switch selecting either lifting or slow & high travel speed.

SB2 : Upside console emergency push button

HL1 : Light visualising alarm codes (Flashing codes).

HL4 : Light visualising travel motion position : slow or high travel speed of SA3

HL5 : light visualising lifting position of SA3.

Solenoid valve

YV1 : Solenoid valve selecting travel or up & down operations. At rest it controls travel, working it drives lifting wire 18.

YV2A : Solenoid valve that controls the forward gear wire 19

YV2B : Solenoid valve that controls backward gear wire 20

YV3 : Solenoid valve that controls high or low travel speed. At rest : low speed, working : high speed wire 21

YV4 : Solenoid valve that controls high or low travel speed ; at rest : low speed, working : high speed ; wire 22

YV5A : Solenoid valve that controls steering right

YV5B : Solenoid valve that controls left steering

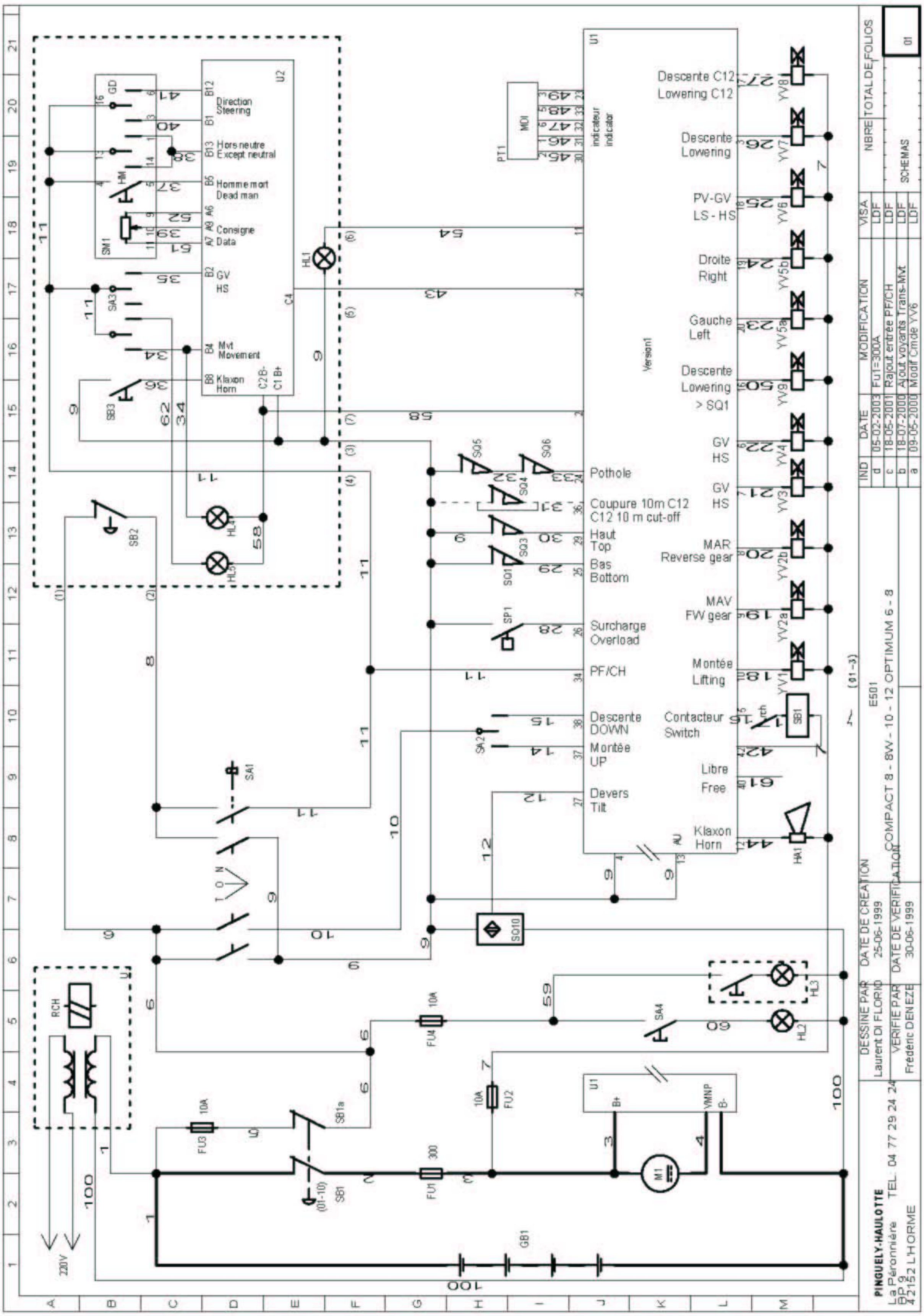
YV6 : Solenoid valve that controls the potholes' spreading out movement only when SQ1 is on 1.

YV7 : Solenoid valve that pilots the low cylinder lowering; wire 26.

YV8 : Solenoid valve that pilots the up cylinder lowering - for Compact 12 wire 27

YV9 : Solenoid valve : principal descent : ON when SQ1 is = 0 wire 50.

3.2.4 Electric diagram common for compact and optimum machines



3.2.5 Function of safety systems

Relays and fuses

FU1: Motor-driven pump fuse
FU2: Controller unit output's security fuse
FU3: Controller unit input's security fuse
FU4: Working light's and revolving light's security fuse (option)

Safety switches

SB1: Chassis emergency stop switch/line switch
SB2: Platform emergency stop switch
SQ1: Tilt resetting position switch
SQ3: Top position switch
SQ4: 8 metres cut-off position switch
SQ5: Pothole output
SQ6: Pothole output
SQ10: Tilt indicator
HL1: Controller fault indicating light
PT1: Controller fault numerical indicator

3.2.6 End of travel switches chart

SWITCH	Movement to perform	Check
End of travel lifting (SQ3)	Lifting	Lifting movement cut-off in high position
Pothole end of travel (SQ5 and SQ6)	Lifting	*Potholes extension when the platform is raised at 1.5 m *Microspeed activation
	*Disconnect YV6 *Lifting	*Lifting movement impossible at a height superior to 1.5m * Travel movement impossible at a height superior to 1.5 m
Tilt resetting end of travel (SQ1)	*Lifting above 1.5m and lowering	*Check that the lowering movement is properly performed ; the movement must be interrupted at 1.5 m
End of travel 8 m switch (SQ4) – H12SN only	* Lifting above 8 m	Travel movement impossible (micro-speed cut-off)

4 – OPERATING EQUATIONS

Steering

Right = YV5 A

Left = YV5 B

Lifting **YV1 + YV6 (When < SQ1)**

Descent

> SQ1 = YV9 + YV 7 + YV 8(if C12) +YV6
< SQ1 = YV 7 + YV 8(if C12)

Travel motion

Slow speed frontward gear	**YV2A**
Slow speed backward gear	**YV2B**
High speed frontward gear	**YV2A + YV3 + YV 4**
High speed backward gear	**YV2B + YV3 + YV 4**

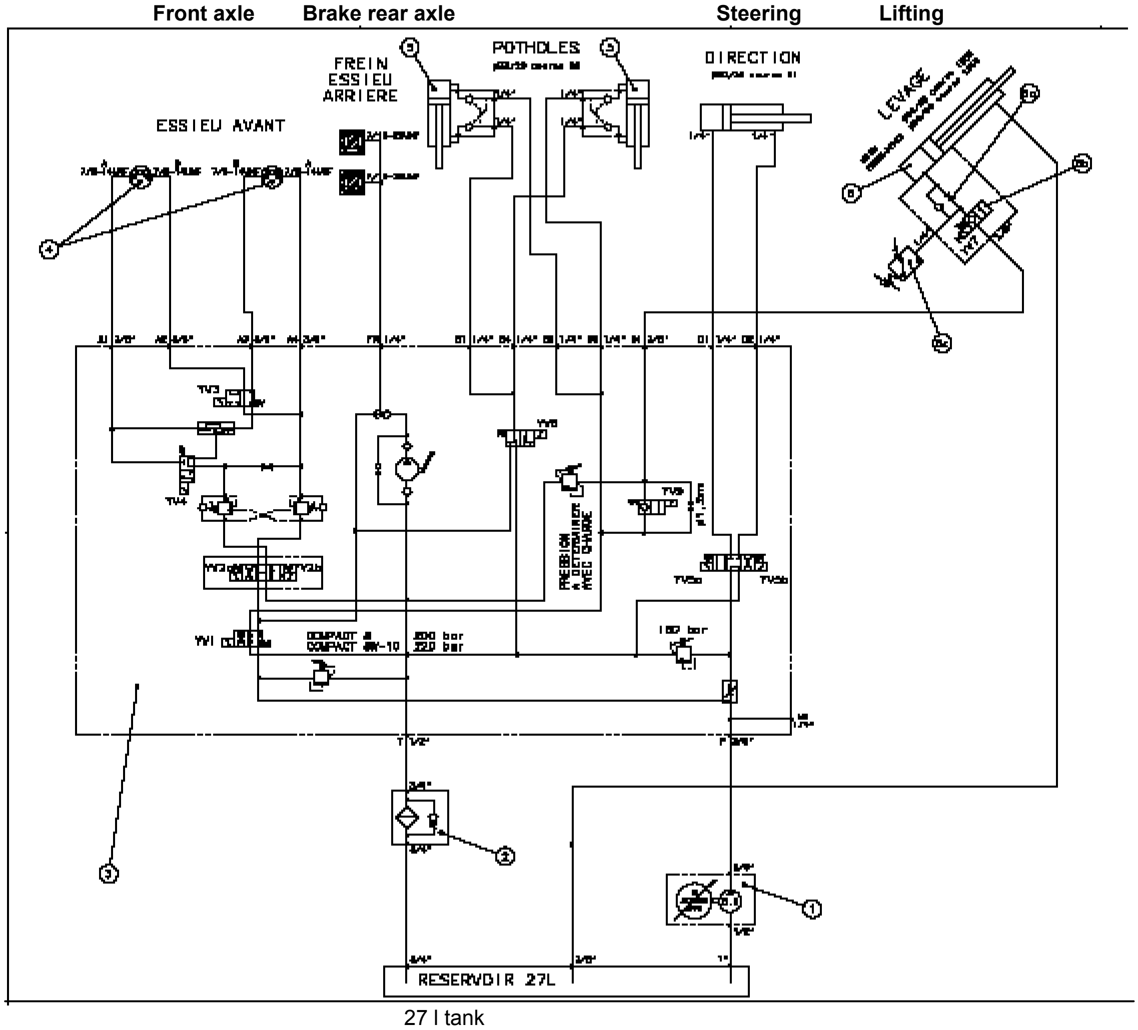
5 – PRESSURES CHART

	USEFUL LOAD	USEFUL LOAD + 10%	Main pressure	Steering pressure
H8SN	Outdoors: 120 kg Indoors: 350 kg	Outdoors: 132 kg Indoors: 385 kg	200 bars	150 bars
H8W	Outdoors: 120 kg Indoors: 450 kg	Outdoors: 132 kg Indoors: 495 kg	200 bars	150 bars
H10S	Outdoors: 120 kg Indoors: 450 kg	Outdoors: 132 kg Indoors: 495 kg	200 bars	150 bars
H10N	Outdoors: forbidden Indoors: 230 kg	Outdoors: forbidden Indoors: 253 kg	200 bars	150 bars
H12SN	Outdoors: 120 kg Indoors: 300 kg	Outdoors: 132 kg Indoors: 330 kg	200 bars	150 bars
Optimum 6	Outdoors: 115 kg Indoors: 270 kg	Outdoors: 126 kg Indoors: 292 kg	230 bars	100 bars
Optimum 8	Outdoors: forbidden Indoors: 230 kg	Outdoors: forbidden Indoors: 253 kg	230 bars	100 bars

Margin: +/- 10%

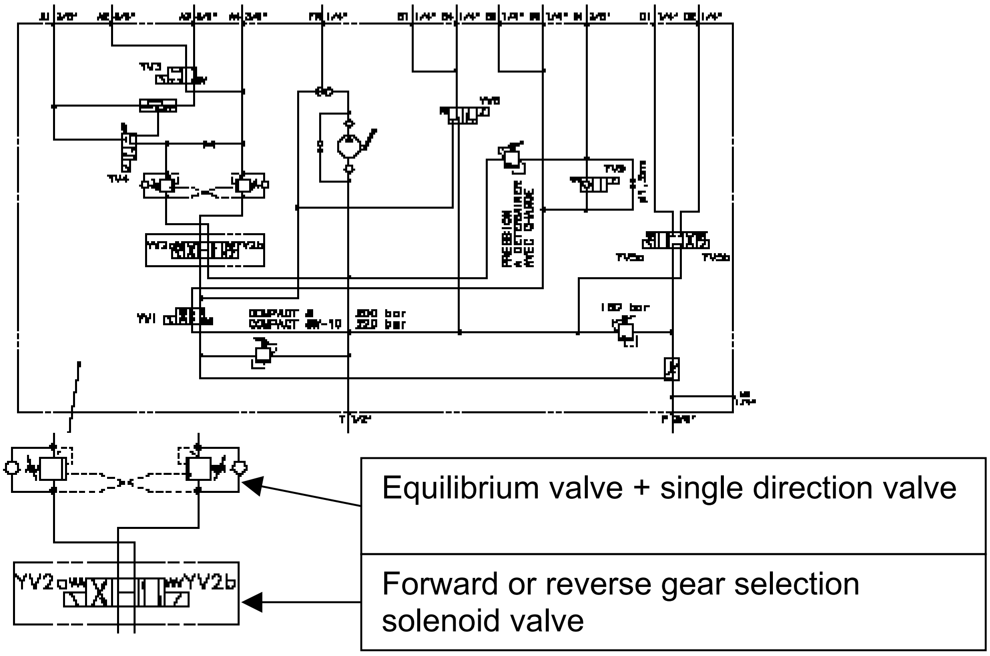
Lifting pressure is adjusted according to the actual load.

6 SOLENOID VALVES FUNCTION



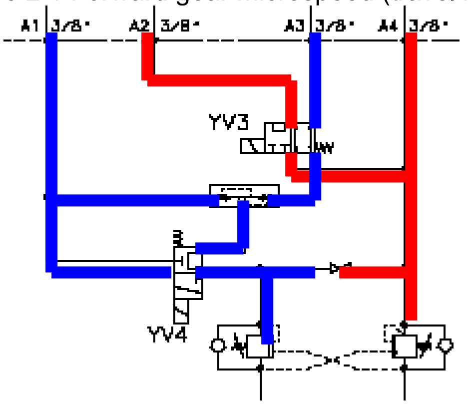
Hydraulic diagram representing the compacts and optimum models' block

6.1 Direction of travel and anti rolling selection

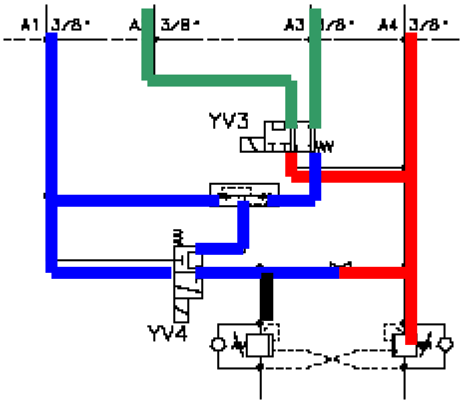


6.2 Speed selection

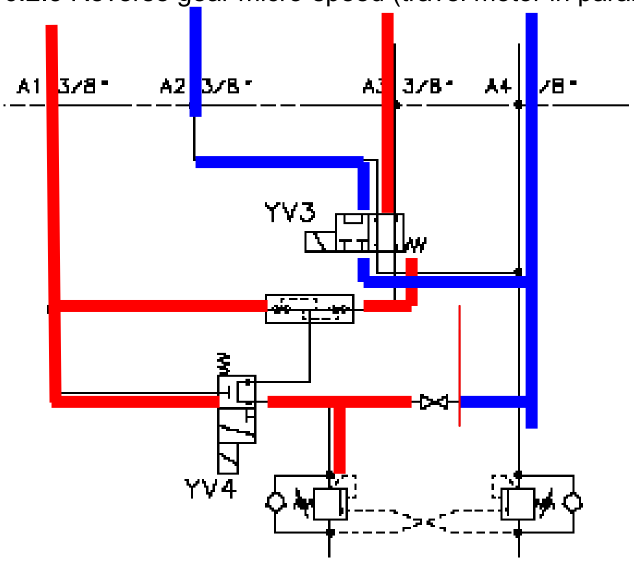
6.2.1 Forward gear microspeed (travel motor in parallel)



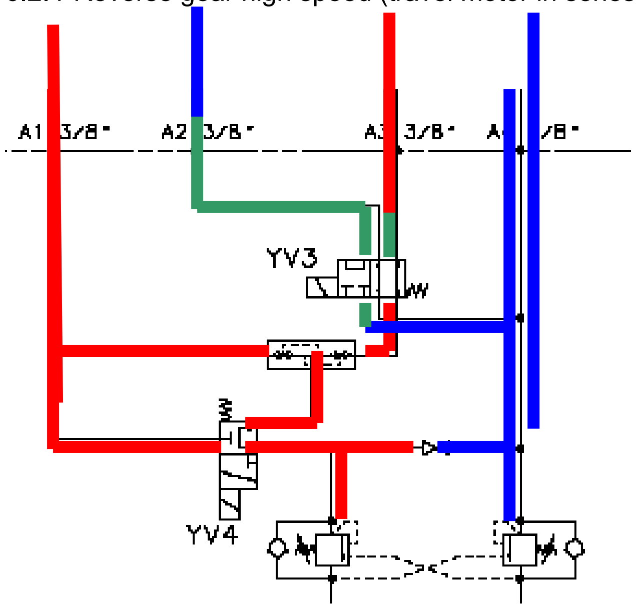
6.2.2 Forward gear high speed (travel motor in series)



6.2.3 Reverse gear micro-speed (travel motor in parallel)



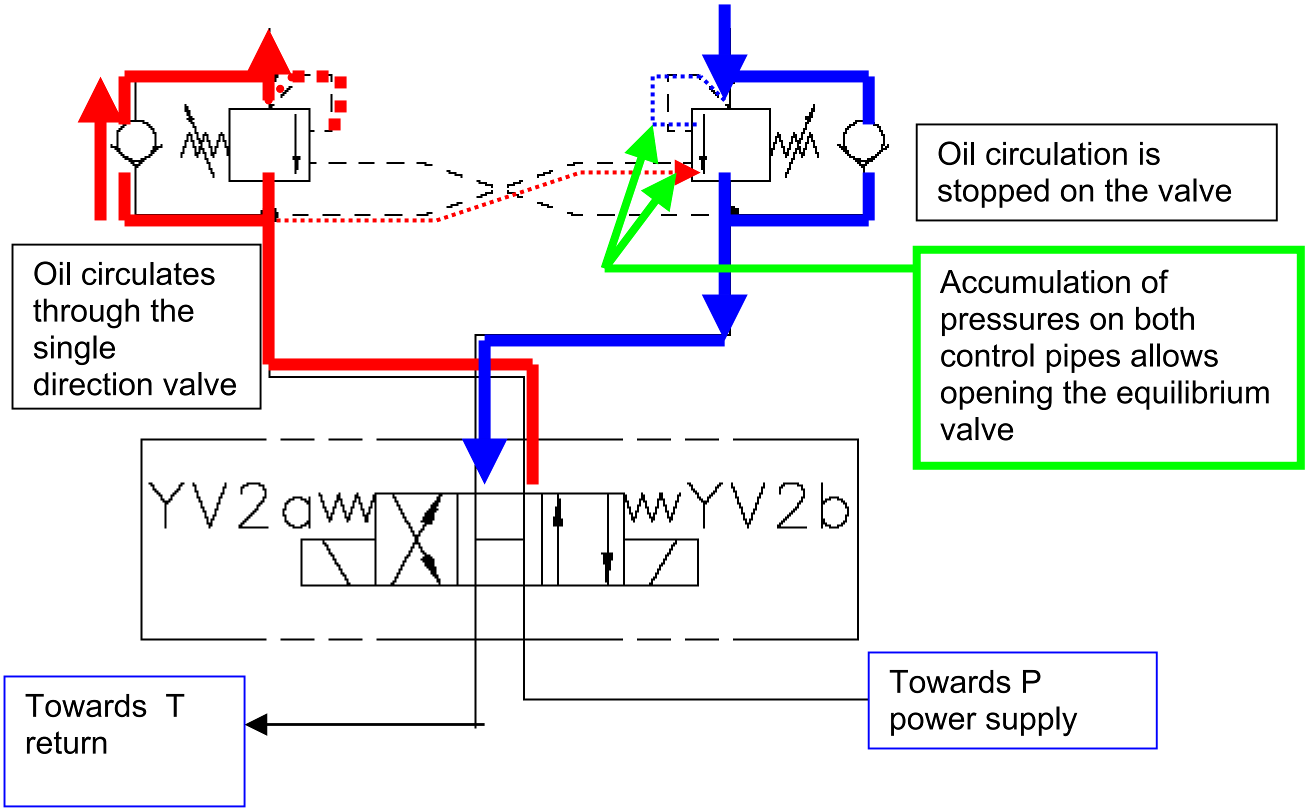
6.2.4 Reverse gear high speed (travel motor in series)



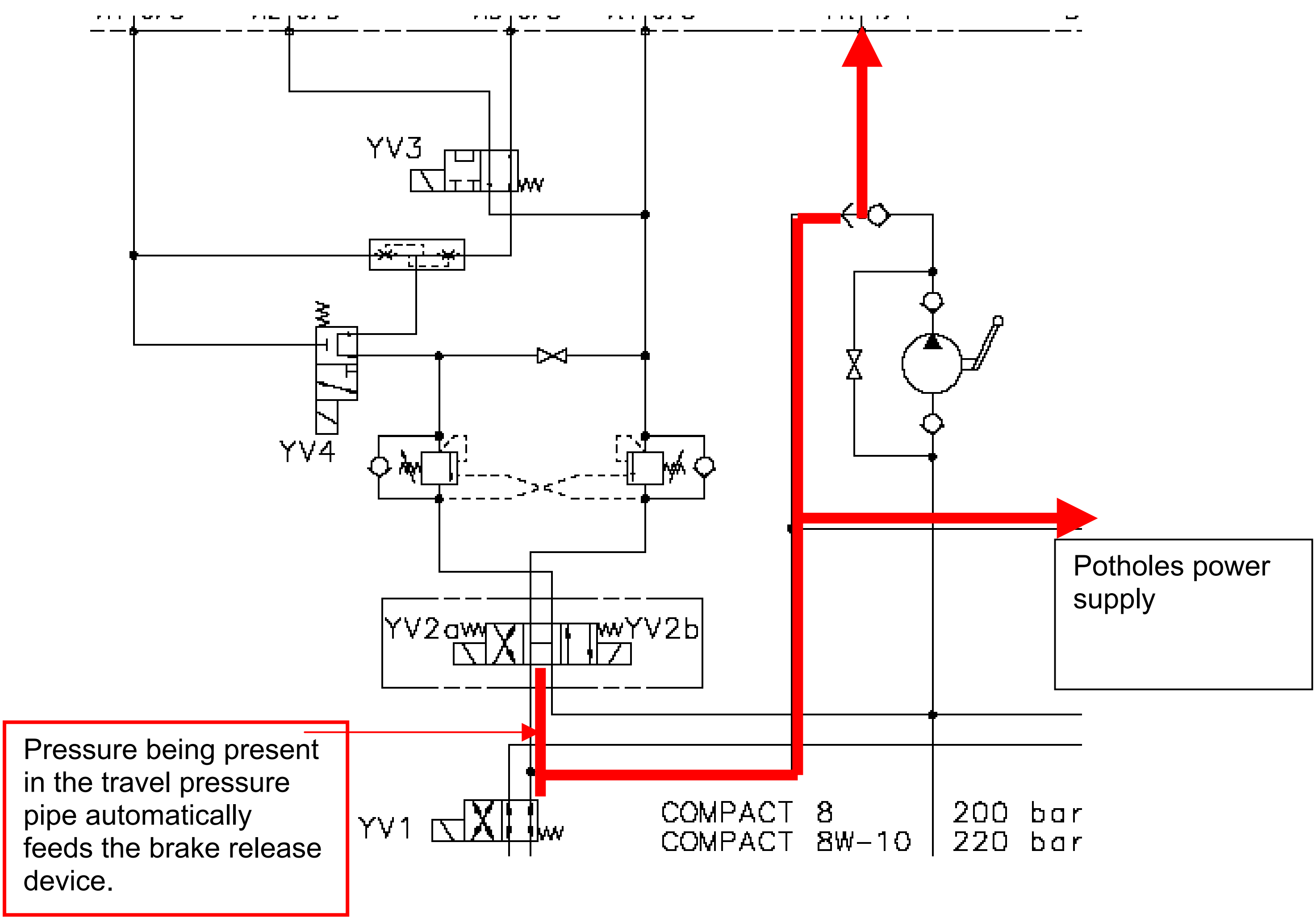
6.3 Balancing valves functioning

The solenoid valve in use is that placed on the return position ; its main role consists in keeping an equilibrium in the travel circuit pressures and ensuring a constant speed preventing the machine from rolling when on ramps. In the following diagram we shall consider that the machine is in forward gear.

6.4 YV1 Travel/movement selection solenoid valve



6.5 Rear wheels brake release power supply



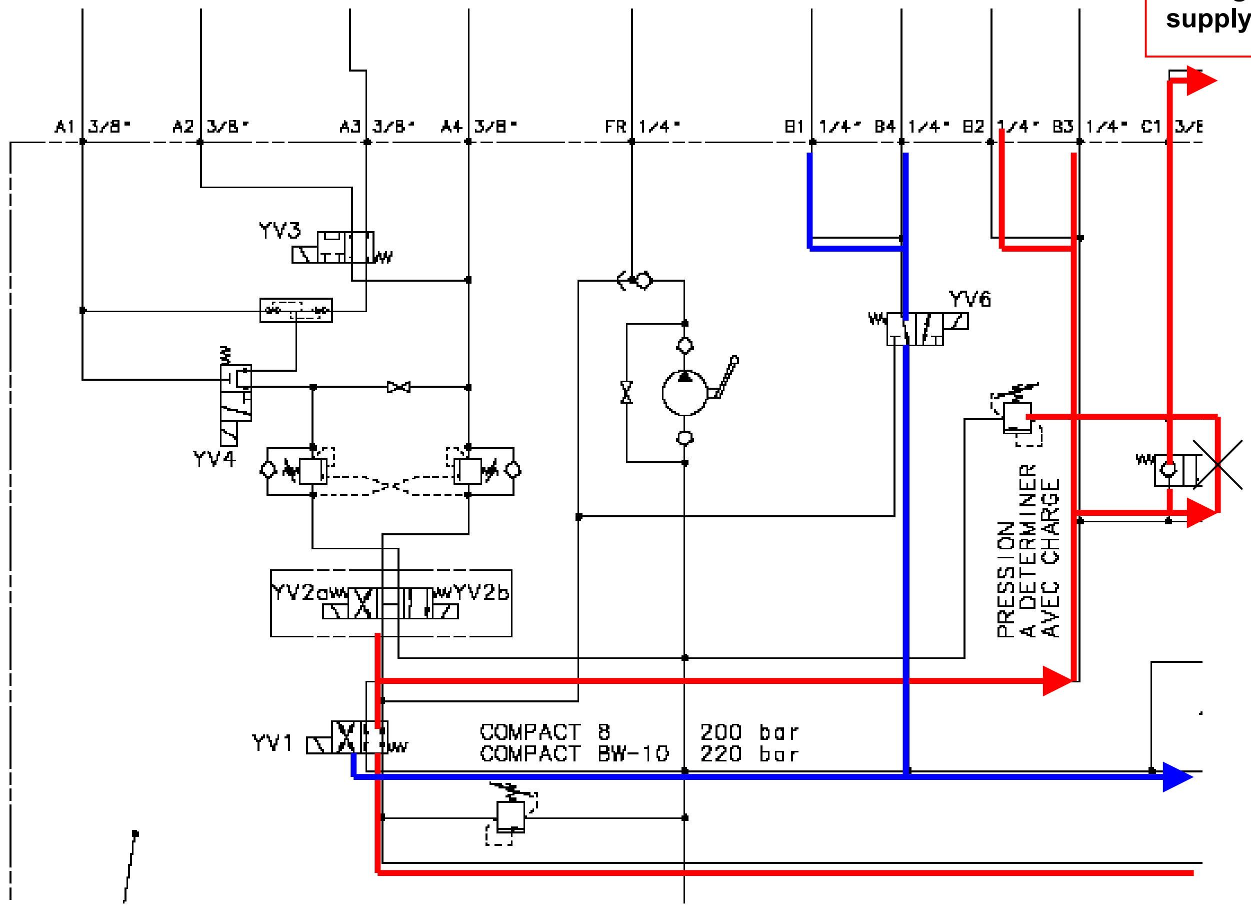
6.6 Potholes functioning

When using the lifting command, hydraulic oil circulation is supervised through the following solenoid valves :

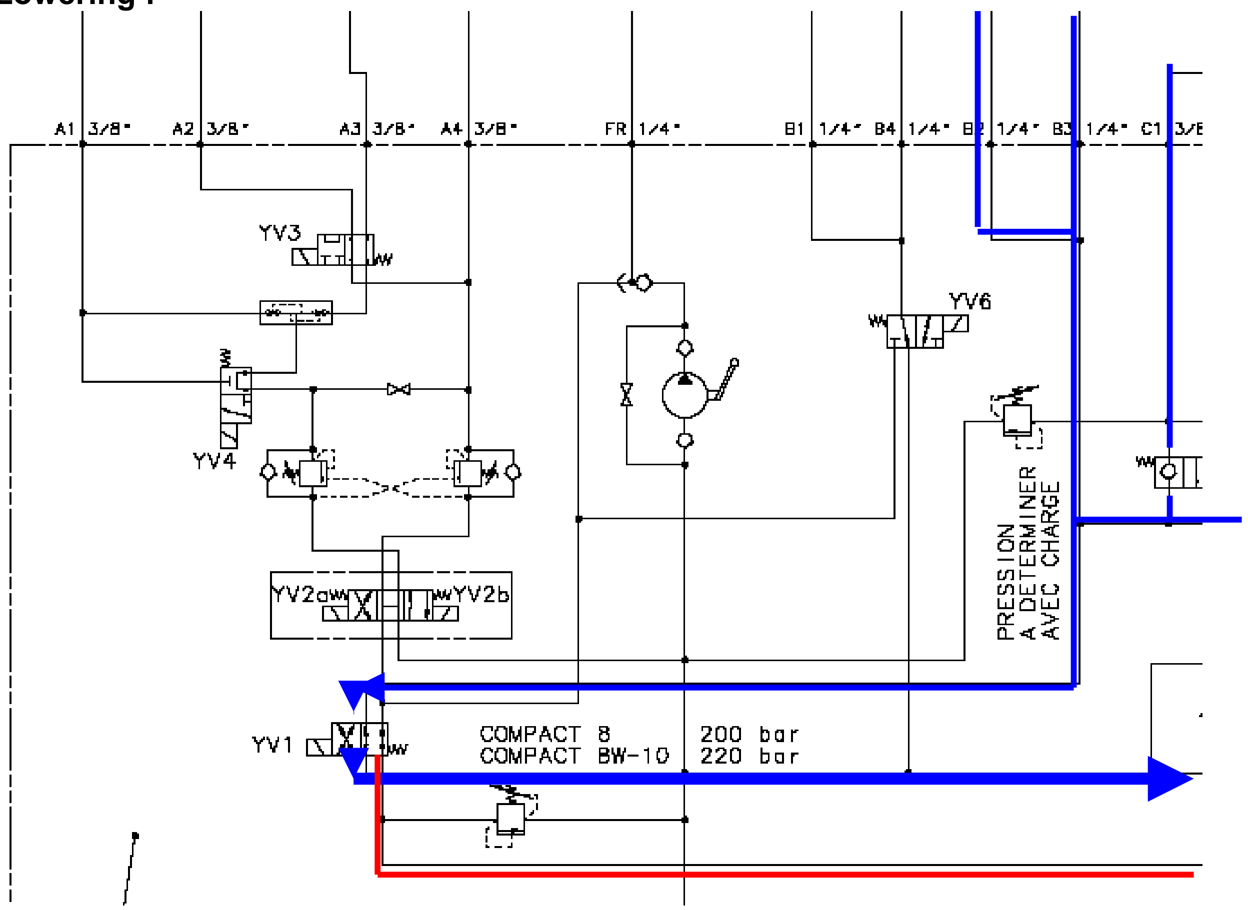
YV1 (in operation position) — Travel/lifting selection. In the lifting position the oil is directed towards the lowering solenoid valve as indicated in the diagram above, by passed during lifting and on the two pothole cylinders chambers. The oil present in the small chambers is sent back to the tank through the YV6 solenoid valve. This solenoid valve will be powered as long as the machine is under the SQ1 switch.

YV6 : — Pothole control solenoid valve

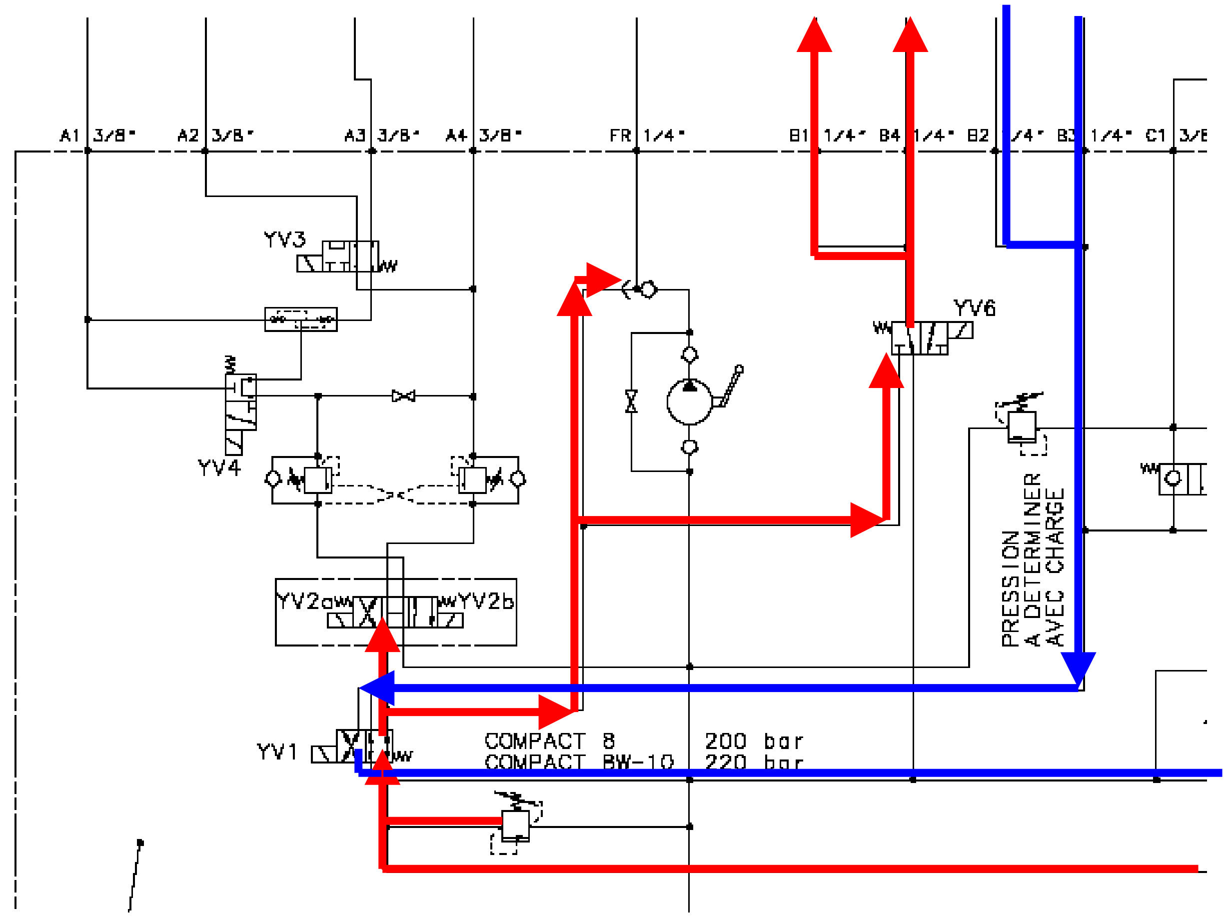
Lifting power supply



Lowering :

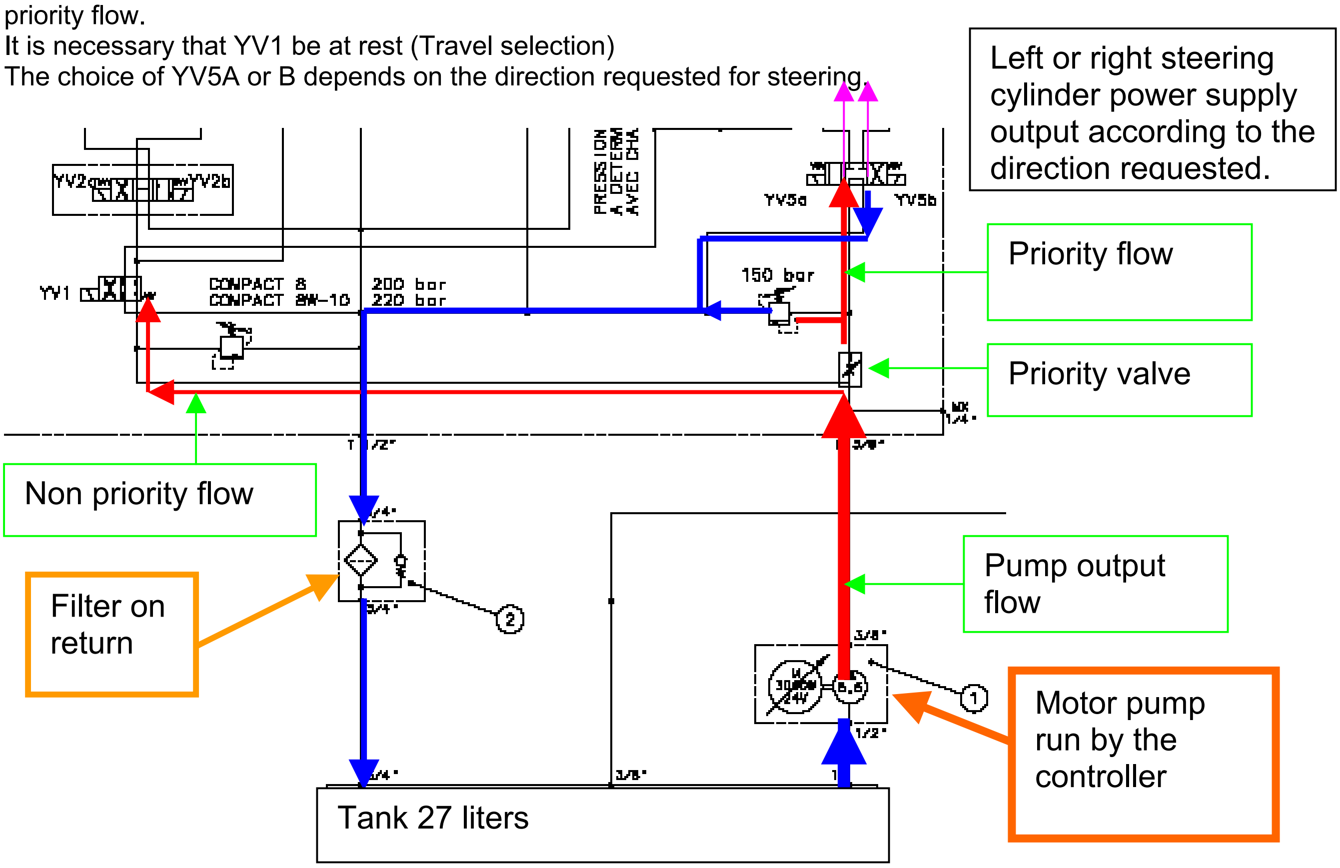


Potholes' re-entry on starting a travel movement under SQ1



6.7 Steering functioning

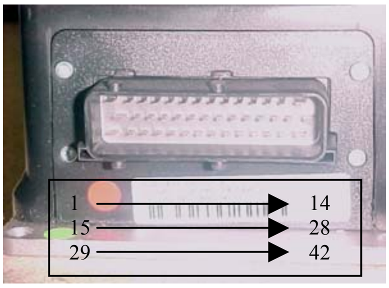
In the hydraulic block input, the oil first passes through a priority valve. The latter powers steering through a priority flow.
It is necessary that YV1 be at rest (Travel selection)
The choice of YV5A or B depends on the direction requested for steering.



7- CONTROLLER

7.1 Presentation


Controller



Controller plug

Terminal-wire connections chart

Terminal	Wire		Terminal	Wire		Terminal	Wire	
1		Not in use	15		Not in use	29	39	Top position end of travel input (SQ3)
2	58	Input -	16	50	Lifting solenoid valve output YV9	30	45	MDI signal
3	26	Lowering control YV7 solenoid valve	17	27	Not in use	31	46	MDI signal
4	9	Input +	18	25	Pothole command solenoid valve YV6	32	47	MDI signal
5	16	Output SB1control	19	24	Left steering solenoid valve control ouput YV5b	33	48	MDI signal
6	22	Output YV4 HS control	20	23	Right steering solenoid valve control ouput YV5a	34	11	Top control panel validation
7	21	Output YV3 HS control	21	43	Series signal input	35		Not in use
8	20	Output YV 2 b Reverse gear control	22	12	Not in use	36	31	+ Batterie
9	19	Output YV2a Forward gear control	23	49	MDI signal	37	14	Chassis lifting control
10	18	Output supplying YV1 : travel movement selection	24	33	Pothole end of travel input (SQ5 et SQ6)	38	15	Chassis lowering input
11	54	Input – indicator light Default indicator	25	29	Low position end of travel input (SQ1)	39		Not in use
12	44	Horn control	26	28	Overload pressure switch input (SP1)	40	61	Not in use
13	9	Input +	27	12	Tilt indicator signal	41		Not in use
14		Not in use	28		Not in use	42	42	Sortie commande SB1control output

7.2 Alarms

Numeric indicator	Flash	Description
0		0 display on MDI + red LED : Battery under 5% or controller out of order.
AL 01 See NOTA	3	YV7, YV9 and wire 3 supply voltage (B+ input, make sure that there is no inversion between wire 100 and wire 3 / incorrect wiring for wire 26. IF all light indicators are lit and default is 01 then controller out of order.
AL 06	6	Serial card or cable or top console power supply socket (wire n°58 / MDI wiring/ MDI/ 7 wire bundle (37;B5/3 ;B5/39. A3/40 ; B12/51 ;A7/52 ; A6/)
AL 13	6	Fault on the EEPROM – controller out of order
AL 32	3	Low VMN at rest and inconsistent with the applied PWM – controller out of order
AL 37	4	Main switch is stuck (battery unit auxiliary contact is open or out of order)
AL 38	4	Main switch open by the control microswitch (battery cut-off out of order)
AL 49	5	I=0 A EVER Current is still null when working (controller out of order)
AL 53	5	High current at rest (controller out of order)
AL 60	3	Condensers don't star loading on switching the key off (250A fuse / motor connections)
AL 62	9	Controller temperature is too high (>75°C controller out of order)
AL 66	8	The battery is discharged
AL 73	1	Short circuit on the solenoid valve / main switch or buzzer
AL 74	4	Main switch driver in short circuit (pb related to the controller or the switch coil) (Wire 19 disconnected on Terminal 9, FW gear on hydraulic block) (controller out of order if the relay immediately gets stuck (no period of time) Switch plug ill-engaged on the charger
AL 75	4	The main switch driver won't close. Problem related to the controller or switch coil
AL 78	2	Top accelerator at rest (joystick pb). Check the potentiometer connection supplied in 51/52, output in 39.
AL 79	2	Incorrect ignition sequence (joystick connection)
AL 80	2	Double operation request (joystick or serial card)
AL 90		YV6 coil is defective or ill-connected. (25/7 wires: theroretical resistance:75 Ohms. Wires 25&27 reversed on terminals 18 & 19
AL 93		Drivers 2KO SIC. Problem resulting from a small bundle situated between the MDI and chassis control panel.
AL 94	6	The control micro switch does not respond to the SIEMENS micro correctly (controller out of order). If the horn sound is too low, change the main switch with coil in direct current.
AL 95	7	Pressure switch alarm

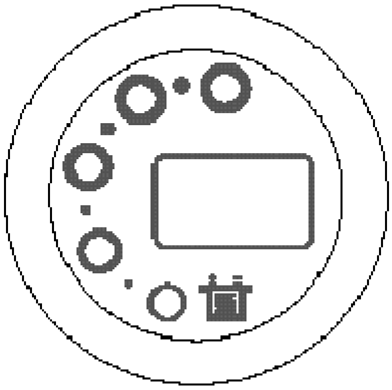
Numeric indicator	Flash	Description
AL 98	0	The controller's hour meter and the MDI's hour display different indications. The chassis' emergency stop auxiliary contacts are out of order.
AL 99	6	Servicing request programmed.

NOTA : *If no situation is displayed and the red and (last) green indicators are lit then THE CONTROLLER is OUT OF ORDER.*
Alarm 01:
-if all green light indicators are lit: controller out of order
-Check YV7 connectors
-DIsconnect the plug on the YV7 solenoid valve
-Take the YV1 coil for testing
-The fault disappears: the coil needs replacing
-The problem remains:
-Disconnect the plug connected to the chassis' bundle.
-Check wire 26 pin: incorrect connection.
-Tests
Alarm 98: *If the controller or the MDI are replaced, this code may reappear on starting up the machine again. In this case, leave the machine switched on for about 15 minutes so as to allow the controller to adapt to and communicate with the MDI again.*

8 – CHARGE INDICATOR

State of charge of the batteries

The state of charge of the batteries provided by the ZAPI MDI indicator is displayed through a series of 5 LED'S, four of which are green and one red.
When the battery unit is charged, the first four LEDS are lit, and along with the process of discharging, these will go out one by one, in the same proportion as the battery's residual charge, until they reach a residual charge value that will cause the red LED to come on and signal that the battery unit is discharged.



Hour meter:

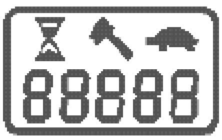
A liquid crystal alphanumerical display unit situated at the centre of the charge indicator dial informs the user about the number of hours performed.

Alarms:

The same display unit used for the hour meter also plays the part of a state of alarm indicator providing a code corresponding to the type of alarm reported. The red LED flashes in order to attract the user's attention.

Software version:

On switching off the key, the eeprom version is displayed on the dial for a few seconds (EPXXX where XXX represents the version). The English key symbol also appears during this phase.



USING THE ON-BOARD CHARGER

CAUTION ! Do not use the machine during charging.

Characteristics
Traction batteries must be charged with the charger provided.
DO NOT OVERCHARGE THEM
- Charger: 24V - 30A
- Power supply: 220V single phase - 50 Hz
- Operating voltage: 24V
- Charging time: approximately 11 hours for batteries discharged by 70% to 80%.

CAUTION ! In cold weather, the charging time increases.

4.5.2 - Starting the charge
Charging is started automatically when the charger is connected to the mains.
The charger is equipped with a light indicator:
- the indicator shows the current state of charge.

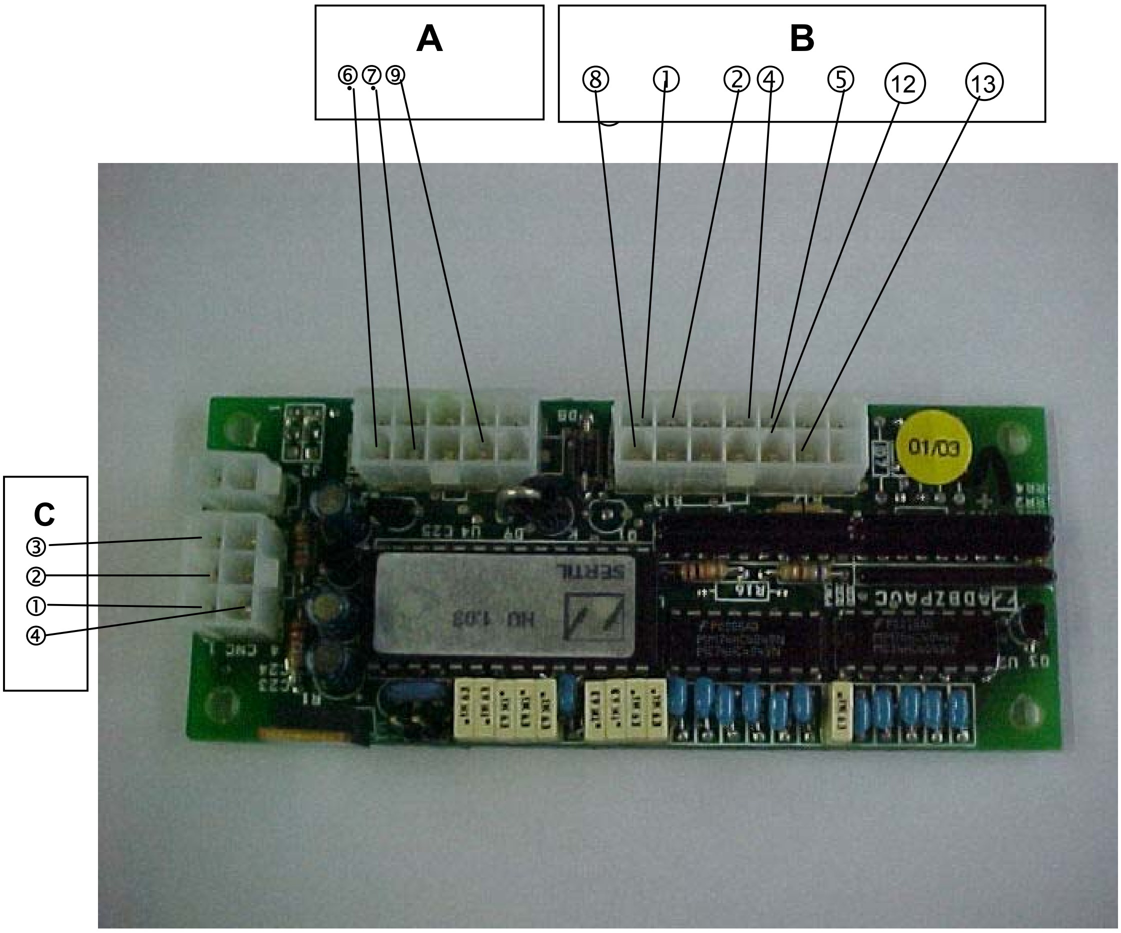
4.5.3 - Maintenance charging
If the charger remains connected to the mains for more than 48 hours, it starts a charge cycle every 48 hours, after the end of the previous charge in order to compensate for self-discharge.

4.5.4 - Charge interruption
Charging is stopped by disconnecting the charger from the mains. If the machine has to be moved during a charge cycle, the charger must be disconnected. This may reduce battery life. After movement, reconnect the charger.

4.5.5 - Precautions of use
- Avoid recharging batteries if the electrolyte temperature is higher than 40°C. Leave to cool.
- Keep the top of the batteries dry and clean. Incorrect connection or corrosion may lead to serious power loss.
- If new batteries are used, re-charge them 3 to 5 times after 3 or 4 hours' use.
- The charger has been configured in the plant with the cable provided. If the cable needs replacing, contact PINGUELY-HAULOTTE for authorisation.

9 – SERIAL CARD

9.1 Presentation



A	B	C
A7 – Wire 51 A9 – Wire 39 (**Accelerator potentiometer**) A6 – Wire 52	B1 wire 40 : Left steering switch B12 wire 41 : Right steering switch B13 wire 38 : Except neutral B5 wire 37 : Dead man switch B2 wire 35 : Travel selection B4 wire 34 : Movement selection B8 wire 36 : Horn	C1 : battery + C2 : battery – C4 : battery signal

9.2 INITIALIZATION OF SERIAL CARD

Emergency stop not pressed.

Put the key on OFF (stop).

Shunt the serial card (J1) with the help of a crimp.

Put the key on ON (start), and operate as follows, slowly:

1. Advance high speed
2. Return to neutral position
3. Release the joystick
4. Backward movement high speed
5. Return to neutral position
6. Release the joystick
7. Climbing
8. Return to neutral position
9. Release the joystick
10. Going down
11. Return to neutral position
12. Release the joystick

When these operations have been done, release the shunt.

Wait 5 seconds.

Put the key in position OFF.

Test the platform.

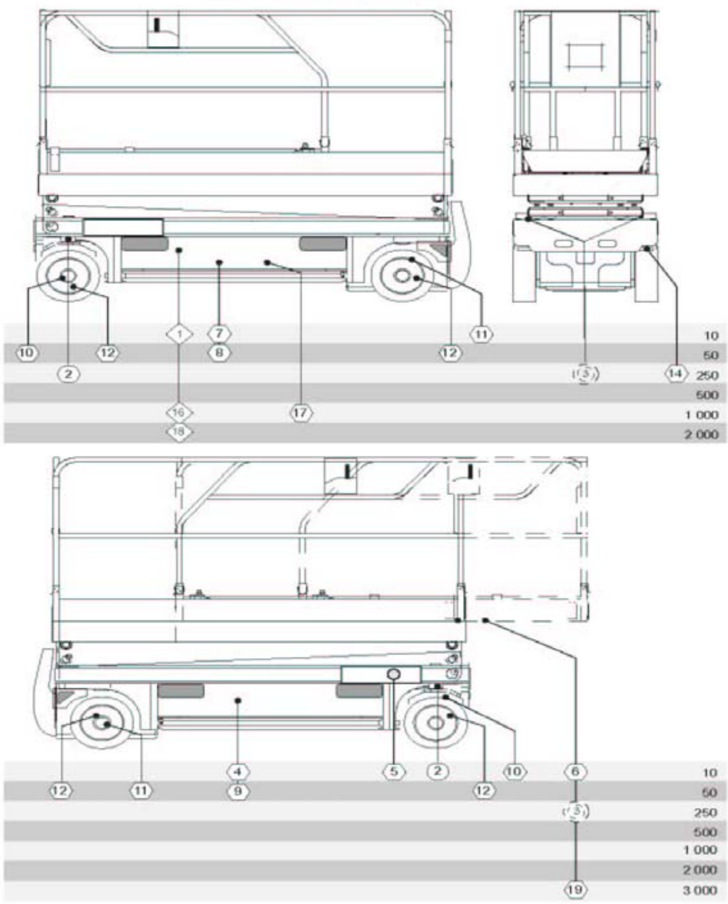
10 – MAINTENANCE

10.1 CONSUMABLES USED FOR COMPACT AND OPTIMUM MACHINES

CONSUMABLE	SPECIFICATION	SYMBOL	LUBRICANTS used by HAULOTTE	ELF	TOTAL
Gear box oil	SAE 15W40	□	SHELL RIMULA-X		
Hydraulic oil	AFNOR 48602 ISO VG 46	◇	BP SHF ZS 46	HYDRELF DS 46	EQUIVIS ZS 46
Lithium grease	ISO - XM - 2	◌		CARDREXA DC1	
Lithium grease	ENS / EP 700	◌		EPEXA 2	
Lead-free grease	Grade 2 or 3	○	ESSO GP GREASE	Multimotive 2	Multis EP2
Replacement or special operation		⯃			

10.1 COMPACT

5.3.2 - Maintenance diagram



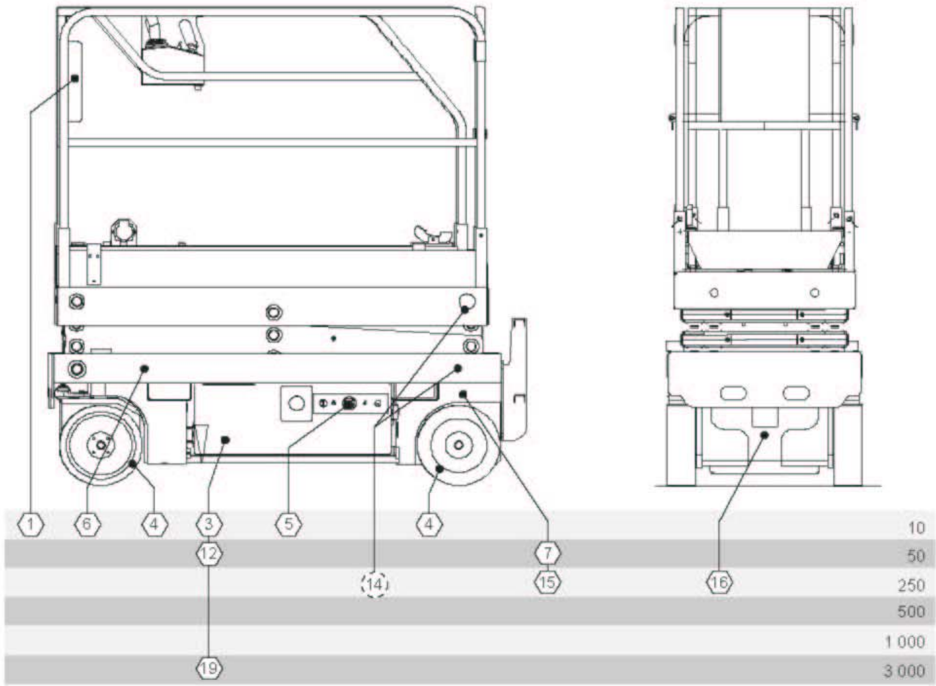
OPERATIONS

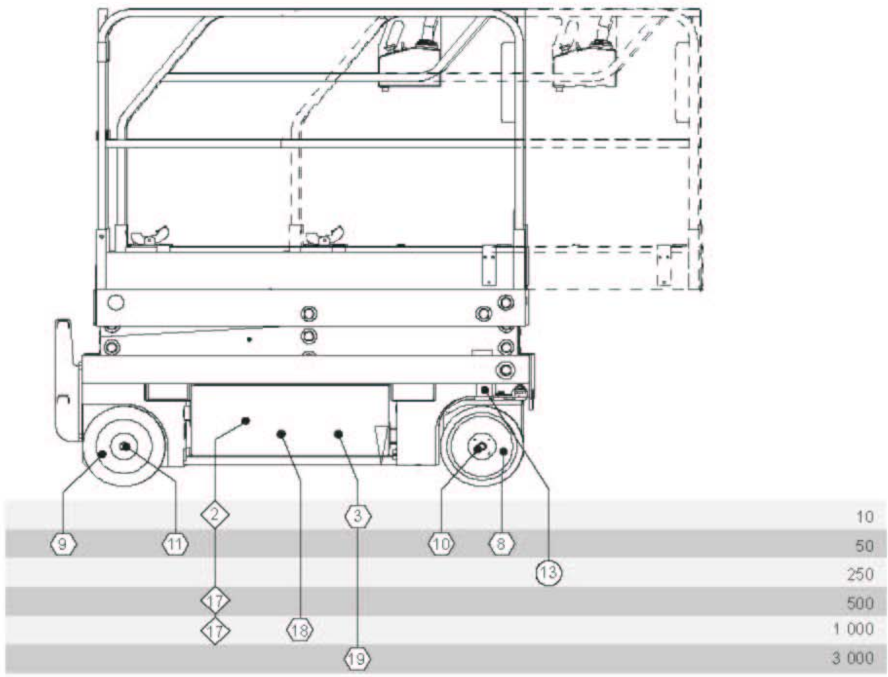
REMINDER: All these intervals must be reduced if working in difficult conditions (refer to the After-Sales Department if necessary).

INTERVALS	OPERATIONS	ITEM
Each day or each time before putting into service	• Check the following levels: - hydraulic oil - electric batteries - charge of batteries, using indicator	 1 4 5
	• Check the cleanliness of the following: - machine (check in particular the watertightness of connectors and hoses), take this opportunity to check the condition of the tyres, cables and all accessories and equipment. - Lift slideway for extension	6
	• Check the clogging of the hydraulic oil filter	7
Every 50 hours	**Caution : After the first 50 hours:**	
	• Change the hydraulic filter's cartridge (see 250 hour interval)	8
	• Check the condition of the battery cables (remove if worn)	9
	• Check the tightness: - of the screws and bolts in general - of the front motor fixing screw (9 daNm) - of the rear brake fixing screw (9 daNm) - of the wheel nuts (torque 110 daNm)	 10 11 12
Every 250 hours	• Change the hydraulic filter's cartridge	13
	• Grease : - the pivot pins on the steered wheels - the friction parts of the slideways (spatula)	 2 3
	• Check: - the connection of the battery charger - the level of the batteries	14
	• Change the hydraulic filter's cartridge	15
Every 500 hours	• Drain the organic hydraulic oil tank (option)	
Every 1000 hours or every year	• Drain the hydraulic oil tank	16
	• Clean the motor-driven pump unit's carbon brush	17
Every 2000 hours	• Drain the hydraulic oil complete circuit and reservoir	18
Every 3000 hours or every 4 years	• Check: - the condition of the slideways - the condition of electric cables, hydraulic hoses, etc…	19

10.3 OPTIMUM

MAINTENANCE DIAGRAM





INTERVALS	OPERATIONS	ITEM
Each day or each time before putting into service	• Check presence and legibility: - of CE manual - of danger warning stickers - of instruction stickers	1
	• Check presence of screws etc	2
	• Check levels of: - hydraulic oil - battery electrolyte	3
	• Check the condition of: - wheel solid tyres, - battery charge on the discharge indicator - wear of the hydraulic hoses - hydraulic connections (no leaks) - electric cables and wiring harnesses (no corrosion or stripped areas) - wear of scissor arm slides and pads • Check proper operation of the tilt detector	4 5 6
Every 50 hours	• **Only the first 50 hours** - change the hydraulic filter.	 7
	• Check the tightness: - of screws etc. in general, - front motor fixing screws (9 daNm), - rear brake fixing screws (9 daNm), - front wheel nuts (25 daNm), - rear wheel nuts (25 daNm).	 8 9 10 11
	• Check: - the condition of electric cables (change if corroded), - density of battery electrolyte - no battery electrolyte leaks	 12
Every 250 hours	• Check: - the connection of the battery charger - no cylinder leaks	13
	• Grease: - wheel pivot pins - friction parts of the scissor arm slides	 14
	• Change the hydraulic oil filter	15
	• Clean the motor-pump unit ventilation hole	16
Every 500 hours	• Drain the organic hydraulic oil tank (option)	
Every 100 hours or every year	• Empty: - the hydraulic oil tank - the hydraulic circuit	 17
	• Clean the motor-pump unit carbon	18
	• Adjust the pressure limiters	
	• Check ring wear	
Every 3000 hours or every 4 years	• Replace: - hydraulic circuit hoses - batteries	 19